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HEALTH WORK PROGRESS IN AMERICA.

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It was not so very long ago that a well-organized department of health in this country was an exception. Today, the contrary is true. Great progress has marked public health work in the United States. Every state in the Union within the last few years has been making great strides forward, so that in no city of any size in our progressive states, in no village or town is it an impossibility to find a health officer whose work is not only to keep track of the birth and death records, but also to look after the contagious and infectious diseases, sanitation of the homes, and very often, the examination of children in the schools. Unfortunately, the Federal government itself has not as yet undertaken the work, which every citizen, every physician who is wide awake and every public health worker is strongly hoping for, viz., a central office with a bureau or department where all knowledge pertaining to public health should be collected and all information sent broadcast.

Even the registration of births, deaths and marriages in this country is not as it should be and the registration area is far from covering the entire Union. This is at present one of the great needs of our economic system, in not being able to have the collection of proper data and registration of vital statistics, of contagious and infectious diseases, and so on, in the Census Bureau. Where, therefore, is this great progress?

In the first place, as before stated, in the organization of municipal health departments which not only bears fruit in the various cities of

which they are part and parcel but they wield great influence in the surrounding country where health officials are influenced by the example of the cities in their neighborhood and look to them for inspiration and good work, in matters pertaining to public health.

How many cities in America two decades ago, had bacteriological laboratories for the purpose of examining milk, water and food? Now every city of importance maintains such laboratories for the purpose of detecting bad milk, bad water, for the examination of sputum and cultures taken from the throats of children, the examination of blood for typhoid fever, of smears for gonococcus, the investigation for diphtheria and typhoid carriers, and the entire range of subjects which are the necessary armamentarium of a modern health department in fighting disease and death.

The examination of plans for the installation of sewers and plumbing in our cities; the inspection of such work done—is a development only of recent years and it marks a very important progress in health work in America.

How many of us for a moment would give up the control of our public and private markets, groceries, bakeries and confectioneries, ice cream and soft drink manufactories; how many public health workers do not believe that this progress made in recent years in the milk production, not only in the cities but on the dairy farms is a most prominent milestone in the progress of public health work; the supply of antitoxin, whether it is against diphtheria infection or tetanus, of the possibility of the development of rabies; the vaccination not only against smallpox but other diseases and especially valuable in recent trials against typhoid. All these spell *forward and progress* in health work in this country. Isolation in infectious diseases; a thorough study of the same—whether it is pellagra or hookworm or Bubonic plague or anterior poliomyelitis—all work of the greatest importance to the community and all work that must in time show great reduction in morbidity and mortality.

For instance, let us consider the last mentioned disease, anterior poliomyelitis. Buffalo has been visited by quite an epidemic, if you might call it such, very recently. Two hundred and fifty cases would not be really considered an epidemic in a large city, if the disease had been measles, whooping cough or chickenpox but anterior poliomyelitis, a disease of which we know very little and which must be fought in ambush and which strikes terror to the hearts of mothers when as high as 60 per cent. of the children affected are liable to become permanent cripples —see what great progress has been made in the study of that disease.

It was only a very short time ago when it was said that it was better to be a hog in America than a child; that the government would send an expert to prevent lump jaw in cattle; to eradicate disease among swine, to stamp out the boll weevil among the trees and plants, where they would be will-

ing to spend hundreds of thousands of dollars on any of these cases mentioned but would pay very little attention if an epidemic were to break out among children or adults.

We had conservation commissions for the preservation of the forests, for the preservation of rivers and interior waterways, commissions to protect fish and game because they have a monetary value to the community, but human life was considered to be so cheap that hardly any attention was being paid to it; but now it is different, and the government at last is devoting some time and more money to the study of maladies of its greatest asset, viz.: the men, women and children.

When anterior poliomyelitis broke out in Buffalo and it was beginning to reach the hundred mark, the government was appealed to to tell us what they knew about this dreaded disease, and what was found in the latest investigations, regarding the etiology, symptomatology or treatment. The government sent men who had spent considerable time in the study of this disease in various parts of the country, first one and then another. The Rockefeller Institute for Medical Research of New York City, asked us whether we would permit a research worker to be sent to our city so that he might study the conditions of the disease here and, perhaps, be able to help in the elucidation of certain phases; the State Department of Health and the city itself did not fail to grasp the situation and for a considerable time and even at the present time, no less than twelve men are attacking this disease from all sides, studying it, experimenting, making a complete survey of the dreaded malady against helpless children.

This is progress; for all of you know, that not a very great many years ago there was neither an institution of medical research nor could the government or state make so thorough an investigation or study of such a situation, having no men or means at their command. Here we see great progress; progress not only in finding the cause of the disease; progress not only in the treatment but also very important, progress in informing the public of the prevention of the malady. To isolate a child suffering from diphtheria or measles or even whooping cough a decade ago, in many communities, and to place the house in quarantine, was considered almost an impossibility, as it would violate public sentiment. Now, no health officer fears attacks from that side but goes ahead, quarantines, isolates and uses various immunizing sera and vaccines in order to rid the community of any danger and save it from extension. Isolation or contagious disease hospitals are being built, not only by cities and counties in various states, but private purses are being opened all over the country in order to give the best possible attention to those who may suffer from a contagious disease. It is true that many hospitals have been erected, but it is also true that, comparatively speaking, few people suffering from tuberculosis, for instance, can be sent to sanatoria on account of lack of suffi-

cient accommodations,—but the communities are aware of the dangers, and progress is being made, remedying the crying needs. What community was there not so many years ago that would think of sending nurses into private homes to look after the sick not only from a non-communicable disease but to any without exception?

We are rapidly stamping out many epidemics by means of sera and vaccines and biological, chemical, and chemo-therapeutic agents—the plague, the dysentery, typhoid fever, and cholera; we are preventing the spread of venereal diseases by various agents, including not only drugs but publicity and sex education. We have noticed considerable movement in various parts of the country that our rivers and lakes from which we draw our potable water supply ought to be prevented from pollution, and organizations are actually being formed which prevent the pollution of our waterways. This is *progress*. Until we stop making open sewers of our rivers, lakes and streams, we cannot hope to reduce the too great morbidity and mortality due to the gastro-intestinal disorders; we cannot hope to reduce the death rate from typhoid fever. Not only are we stopping the pollution of our waters but we have taken steps by chemical, by biological and by physical agents to purify our sewage—and all this is but the progress of recent years.

Take the great battles which are being waged against the fly, the mosquito and the rodents; the war against tuberculosis on which millions and millions of dollars are being spent, not only in the hospitals and sanatoria, not only in the segregation of those who are suffering from this disease, but in taking most active steps in preventing the development of the disease, by building hospitals not only for chronic but also for incipient cases, by maintaining day and night camps, sending literature into the homes, placarding the fences with instructions and using all means whereby knowledge may be disseminated for the prevention and the cure of the disease.

Health work to be efficient and to be progressive should have a number of co-partners. First of all comes the public press, acknowledged not only as a disseminator of news, but chiefly as an educator and moulder of public opinion. The press of America is the peer of any in the world and while there may be differences of opinion as to the manner of obtaining certain results, yet all strive to accomplish the greatest good. Among the other co-partners are the departments of education, public safety, police, poor, railroads, the numerous clubs, philanthropies and granges, and above all, the great public; the final tribunal. Public health workers in America are frank to acknowledge their indebtedness to all these.

There are many directions whereby this country can make great progress in public health work. It has made a great step forward when medical and dental school inspection was instituted, when publicity of health work was advanced in the press and by platform lectures before associations and

gatherings; when persons afflicted with mental diseases were properly treated in psychopathic wards and literature disseminated to prevent insanity. How much more can be done?

Let me for a moment note the fact that we have a most thorough inspection of the milk supply, of our meat supply, of food adulterations, but in how many communities in this country have we properly protected not only the inhabitants, but the stranger and traveler from infection by preventing the drinking of contaminated water from pumps and wells? You ask the average farmer or average person what he thinks about the water in the well on his premises and he will invariably tell you that the water is pure, clear and sparkling and yet, how many of these wells may not be contaminated with pathogenic germs? The inspection of many other things is no reason why a most thorough inspection should not be made of the wells, lakes, rivers and streams—that all water supply not only in the cities but in the farming districts should be guarded. The state or county should order a most thorough control, and a periodical examination should be made and an official notice posted at all sources of water supply, stating the condition of the water, whether it is pure or otherwise, whether it is liable to bring about a disturbance of the gastro-intestinal tract or not.

Much has been done in public health work in this country but considerable more is yet in view. This is but a résumé, short and free from detail and yet, perhaps, may throw considerable light on the work which is being done to prevent the various communities from disease and many unnecessary deaths.

HOW SHALL WE SPEND THE HEALTH APPROPRIATION?

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Read before the Massachusetts Association of Boards of Health, January 30, 1913.

It must be admitted that we cannot spend it as we would like. All human endeavor is hampered by tradition. Much of the work of health officers is done because it has been done before. Most sanitary procedure dates back a very long time and is based upon notions or theories developed when science and scientific health officers were even more rare than at present. If one were given a fixed amount each year for sanitary purposes, to be expended as he deemed most effective, untrammeled by precedent, it is not likely that a single city could be found to furnish a budget one would care to take for a model. No health department has as yet been organized on a scientific basis. Its powers and duties are given to it hap-hazard, sometimes from terror at an epidemic, sometimes at the insistance of a trade which hopes for benefit, sometimes because a councilman through exuberant enthusiasm, or for personal reasons, pushes a pet project, and sometimes, and this with increasing frequency, because some band of earnest reformers with more energy than wisdom, hopes to abolish some sanitary evil by plans of its own. More rarely it happens that a well conceived plan of the health officer is crystallized in an ordinance and vivified by an appropriation.

The merchant or the manufacturer if he hopes to succeed against competitors, must by good accounting learn which goods yield the highest profit. So the health officer, if he wishes his department to have its due share of the municipal budget, must learn which line of work yields the most for the sum expended. He should seek for greater financial assistance for the most effective work and should eliminate, cut down, or at least not emphasize, those functions which yield little return for the money. It is difficult to change the directions of sanitary endeavor but certainly it is our duty at frequent intervals to take account of stock and try thereby to discover the most profitable lines. It is also our duty to clearly set forth our conclusions even though it may not be easy to convert the public, and particularly town and city councils, to new view points.

One notion of which we must disabuse ourselves is that human life is priceless. There is, I know, a species of cant which loves this phrase and we are told that any expenditure is warranted which will save life. But people do not really consider life priceless. During the last decade I sup-

pose that several thousand lives have been lost in automobile accidents, but most of us are willing to take the risk and no one suggests the abolition of automobiling, which alone would stop the accidents, though legislation is called for which would reduce them to a minimum. If the cost of saving life by official sanitary action is too great, that line of effort had better be abandoned even if lives are lost. A few deaths occur each year from trichiniasis. These could doubtless be prevented by a microscopic examination of each slaughtered hog. The cost however would be enormous, and it would not be worth while. A hundredth part of the sum if devoted to baby nurses would save a thousand times as many lives. There never will be a large enough health appropriation to do everything that will save life so let us try and spend it so that it will save the most lives.

In considering public health work we must take into account not only its cost to the municipality but also its cost to the citizens directly. We must estimate not only what it costs the health department to abate nuisances, to inspect plumbing, to improve the milk supply, to teach mothers how to save their babies; we must also consider how much these improvements cost the property owner, the builder, the consumer of milk and the mother. It is as unwise and unjust to throw a heavy financial burden on the citizen as it is to place it upon the city.

Lastly we must consider cost in connection with certainty of result. A man might be entirely justified in investing his savings in a cotton mill when he should hesitate to buy mining stocks or start an air-ship factory. We know that vaccination prevents smallpox, antitoxin cures diphtheria, the purification of water reduces typhoid fever, anti-mosquito measures exterminate yellow fever and malaria, and rat-proofing stops plague, but do we know that the isolation of advanced tuberculosis checks the disease, or that the inspection of milk farms limits epidemics, or that an anti-fly campaign reduces typhoid fever, or that meat inspection lessens disease, or the cremation of garbage lowers the death rate. I am not saying that these latter procedures may not be useful but that they do not justify expenditures as do those first named.

Much of the work of health officials may have very little direct influence on the public health but yet may be of great importance, and indeed may be looked on as a necessity for public comfort and convenience. In our financial statements we should segregate as far as possible the expenses of this kind of work. The Federal Census Bureau in its comparative statistics of cities has thus attempted to separate expenses which directly affect health as of medical inspection, laboratories, hospitals, school inspection, prevention of infant mortality and the like from those which indirectly affect it, as charges for the removal of ashes and garbage, the prevention of ordinary nuisances, smoke prevention, plumbing inspection and public comfort stations.

Many of these expenditures for the public comfort we would not wish to see cut down but we should object to have them considered as truly health expenses even though in many cities they are placed in the health department.

One of the debatable public health functions is that of sanitary inspection. There is no doubt that the sanitary inspection which banishes excrement is worth what it costs. There is no doubt too that the general cleanliness of premises conduces to personal cleanliness. In certain cities inspection directed against rats or mosquitoes is of fundamental importance. Some claim that great attention should be given the fly but they have not proved their point. In the average city of the north, the tendency is to make too much of sanitary surveys and the abatement of nuisances, much of which had better be left to the police. A few years ago most cities spent far more for nuisance inspectors than for medical inspectors and nurses and there are not a few which do so at the present time.

The inspection of plumbing, while desirable, has in many places been carried to an extreme, entailing needless expense on the builder. It is not properly a public health function.

So too, scavenging, the removal and disposal of garbage, ashes, refuse, night soil and dead animals, should not be considered primarily health work, though it is necessary enough, and ought to be done well, and sometimes the health department proves more efficient for its accomplishment than does any other. In New England most of the garbage is fed to swine. This usually causes some nuisance but ought not to cause much. I have never learned that it is a menace to health. Yet there is a constant pressure on our cities to adopt a more "sanitary" method of disposal by cremation or rendering. This usually entails a heavy additional expense. If the new method *is* sanitary and there is plenty of money, well and good, but if children still die from lack of antitoxin, or cannot get good milk, or perish from lack of doctors' or nurses' care, is it not better to feed the pigs a little longer?

For the present at least the control of the infectious diseases seems to be the most important and one of the most effective departments of public health work. Efficient medical inspection in typhoid fever, summer diarrhea, scarlet fever and diphtheria certainly prevents the extension of these diseases within and without the family. This is most apparent in the history of such work in small communities. Perfunctory inspection and advice amounts to little and is therefore wasteful. Efficient inspection will cost little more and will yield results well worth the cost. The value of visiting nurses in the infectious diseases we know little about but the outlook is promising. Let us go slowly and *record our results* lest we become extravagant.

Antitoxin saves many lives. It might save many more. To get the best results it is necessary to administer antitoxin as well as to give it away. In this way it is given earlier and in better quantities. In New York in 1909 of 566 cases treated with antitoxin by private practitioners 69 or 12.2 per cent died while of 1749 treated by the health department doctors 58 or 3.3 per cent died, a saving of 151 lives. The cost of the service was $18,000 or $130 per life saved. Similar results from free treatment are obtained in Providence where it has cost about $100 for each life saved.

Vaccination against smallpox ought to be one of the most economical of sanitary procedures. If every one could be thus immunized, as in Germany, the disease could be eradicated. It might cost $2,000 or $3,000 a year to keep 100,000 people immunized, a cheap insurance. General vaccination during an outbreak is less rational and less effective, but much cheaper and much more effective than isolation, indeed the latter alone is usually, in an established outbreak, not effective at all. Vaccination against typhoid fever and perhaps against some other diseases is also at times cheap and effective.

Quite at the other end of the scale of usefulness is terminal disinfection but perhaps it is only necessary to say in this connection, what probably most of you would agree to, that much of the money now spent for this purpose could be used to better advantage in other ways.

Hospitals for contagious diseases are expensive. When scarlet fever hospitals were urged in England thirty years ago it was believed that they would cause the eradication of the disease. Instead there is really no convincing evidence that they have at all lessened its incidence. Nevertheless, paradoxical as it may seem, there is evidence that removal to the hospital does prevent the spread of disease in the family. In Providence it appears that removal to the hospital cuts down secondary cases one third. If this were the only result of hospitalization it would not be worth the cost but most hospital cases cannot receive proper medical care and nursing at home and many lives are saved by removal to the hospital, particularly in diphtheria and measles. It is easy to extend hospitalization too far and many cases which are ready to go to the hospital, to save home trouble and expense, could be just as safely, and more economically, cared for at home.

The campaign against typhoid fever is very profitable. It has been shown that the cost of protecting the water supply is amply repaid by the prevention of sickness and death. But filtration and the tapping of new sources are usually based on other reasons besides health conservation, so that it is not fair to charge all the expense to sanitation. It has also been demonstrated that the removal of privy vaults markedly diminishes typhoid fever. In Providence I have no doubt that a hundred cases a year were prevented thereby. An actual investigation has shown that a single case

of typhoid fever costs at least $125, and as the total expense to the health department of the removal of the vaults, was less than $5,000 it appears that the cost of removal has been paid twice over every year since it was done; and the vaults should have been removed as nuisances even if they had no effect on health. We have of late been told that typhoid fever is propagated by dirty back yards and flies, and Levy in Richmond and Terry in Jacksonville claim to have greatly reduced the prevalence of typhoid fever and other fecal-borne diseases by efforts directed against privies, flies, and general dirtiness. If their claims are correct, well directed sanitary inspection may be another cheap method of fighting typhoid fever. So too district nurses and anti-typhoid vaccination may prove of great assistance, but as we begin to make use of them let us count the cost and tabulate the results as an up-to-date manufacturer would count the cost of a new process.

One of the most attractive fields of sanitary endeavor, from a financial standpoint, is the prevention of infant mortality. It has now been demonstrated beyond a doubt that the chief cause of a high infant death rate is the ignorance of the mothers. It has also been shown that this ignorance can be overcome by visiting nurses, baby consultations and the like. Wherever these are used intelligently the death rate falls. In Providence it appears that about 200 babies a year have been saved in this way. It costs about $6,000 a year to do it, or $30 per baby.

Milk supervision from the chemical standpoint is necessary to protect the pocket of the father as well as the nutrition of the child. It is worth all it costs. There is evidence too that dirty milk causes disease which clean milk would prevent. There is, however, dispute as to the degree and kind of cleanliness, that is freedom from bacteria, most essential. Under the circumstances it is well to go slow as regards both the expenditure of the health appropriation and increasing the cost of milk. Many cities have done much to improve the milk supply, but have done nothing to show the people where to get the good milk so the babies still die because their mothers buy the poorest milk in the city.

The inspection of foods has little relation to the public health though it is a subject which yields many startling news items and lurid editorials. One of the most absurd activities is the fight against "bob" veal. There may be reasons why the raising of calves should be encouraged as there are certainly humane reasons why the railroad traffic in nursing calves should be stopped, but there is no good reason for forbidding the use of immature veal for food. It may at times cause sickness but so do strawberries and lobsters and mince pie.

Certainly the very worst use which can be made of the health appropriation is to employ it for the purpose of paying political debts. Decreased efficiency is the sure result and the community which permits

such a misuse of the public funds will deservedly suffer an increasing toll of sickness and death.

I am inclined to believe that the medical supervision of school life is an exceeding profitable line of sanitary endeavor. Nevertheless it must be admitted that few departments keep records in such a way as to show what is really being accomplished and at what cost. In Providence in 1911, taking account only of the more serious conditions such as malnutrition, tuberculosis, deformities, greatly enlarged tonsils, marked adenoid disease, middle ear disease and defective vision, to secure adequate treatment it cost about two dollars for each child. Much other work was done in minor skin diseases, pediculosis and a great number of comparatively unimportant ailments. It is desirable in this school work to give more careful study to methods and costs in relation to results, and if funds are limited, to focus attention on the more important "defects," striving to use properly this word so often abused in this connection.

One of the least costly and most productive lines of work is the keeping of accurate records of sickness, deaths and of expense. When a business concern goes into the hands of a receiver and the accounts are found in hopeless confusion, suspicion falls on the efficiency if not on the honesty of the former manager, and it may fairly be assumed that if he had kept a better oversight through accurate accounting there might not have been a receiver. When your committee on uniform health reports discussed with various members of this association the necessity for full and accurate records and accounts, a very good friend of the writer suggested that such things were of no use to anybody except some statistical crank like old Chapin. Yet I feel very certain that the time will come to most health officers when, in order to answer the pointed questions of some newspaper man, city councilman or social worker, there will be felt sore need for accurate statements of cost and results.

It is difficult to measure the worth of a bacteriological laboratory in terms of sickness prevented, just as it would be that of postage stamps, a telephone or a horse or automobile for an inspector. A bacteriological laboratory, is a tool, essential for the control of infectious diseases, just as a chemical laboratory is necessary for control of the milk supply. We cannot get along without either.

Educational work ought to yield great returns for the money. Lectures, exhibitions, moving pictures, leaflets, bulletins and press articles are all useful. Their relative effectiveness should be studied, just as an up-to-date business man studies advertising. The great problem is what to teach. To teach what is not so is far worse than not to teach at all. How much of what passes as sanitary science is not worth the name. The man who has to get out a weekly health bulletin is certain to print many half

truths as well as full fledged errors. It is sad to ask the public tomorrow to forget what they were taught today.

The purpose of this paper is not to offer dogmatic statements as to the value of this or that sanitary procedure but rather to ask questions and offer suggestions, and no attempt has been made to cover the whole field of sanitary endeavor. The paper is primarily interrogatory and I am asking this question "How shall we spend the health appropriation" of myself, fully as earnestly as I am asking it of you. If we will all take up these problems for careful consideration and study I am sure that it will lead to a more effective and economical expenditure of the public funds.

ELEMENTARY THEORY AND PRINCIPLES OF STREET CLEANING

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Read before the Sanitary Engineering Section, American Public Health Association, Washington, D. C., September, 1912.

The cleaning of city streets is necessary for several reasons which may be summarized as the preservation of the public health, the physical comfort and convenience of the people, and a regard for decent cleanliness and good appearance.

Of these, the preservation of the public health must be considered of first importance.

Filthy streets have long been held by sanitary authorities to be a prolific cause of disease. But our views as to the exact way in which street filth causes or propagates disease have, in the light of more recent investigations and conclusions, undergone a notable change. The prevailing idea in the past, among sanitarians and physicians as well as in the public mind, has been that filth and organic matter in the process of decay gives off poisonous gases or exhalations capable of conveying if not of creating various diseases in the bodies of those exposed to it. Thus, it was held that the effluvia from sewers entering dwellings through untrapped pipes and fixtures was the direct cause of much sickness.

More recent investigations and the development of the germ theory of diseases led to the conclusion that a large number, if not all of the infectious or contagious diseases that affect mankind are caused, directly or indirectly, by specific organisms which propagate and multiply in the blood, and that these organisms or their germs are carried into the body not by gaseous exhalations, but only by solid or fluid matter with which the germs are incorporated or to which they are attached. We, therefore, hear little now, from those qualified to express an opinion, about the deadly character of sewer gas, and other like emanations.

The smells and effluvia from filth and decaying matter, while they may affect the general health and lower the vitality, and thus make those exposed to them more susceptible to attack, are no longer regarded as in themselves able to create or to convey specific diseases. The organisms that cause these diseases must reach the blood through physical contact or by conveyance in connection with solid or fluid matter introduced into the alimentary or respiratory systems.

These conclusions have an important bearing upon the theory and practice of street cleaning.

From the sanitary point of view street dirt may be divided into two physical classes or forms: first, the comparatively fresh, coarse and recently deposited material, such as animal excrement and the usual refuse matter and rubbish that reaches the streets, and second, the finely comminuted matter, which, when dry, is called street dust.

The first, especially when damp, possesses sufficient ponderability to prevent its being taken up and carried by ordinary currents of the air. It may be repugnant to the sight and smell and the effluvia given off by it, particularly if allowed to remain until it becomes putrescent, may to a certain extent be deleterious to the public health, but under ordinary circumstances it can not be a vehicle to convey disease germs into the human system. The hypothesis that it does not do so is supported by experience. It is quite common, especially abroad, for persons and families to live over or near unclean stables in which domestic animals are constantly kept, or in the immediate vicinity of piles of decaying manure, without any appreciable effect upon the health of those so exposed. It seems to be established by abundant experience that laborers constantly engaged in the handling of fresh and usually moist street sweepings in large masses, enjoy as good health as those of the same classes engaged in other occupations.

Reasoning, therefore, from both theory and experience the conclusion seems warranted that ordinary fresh, coarse and damp street dirt, even when in a condition of partial putrefaction, is not normally a source of serious danger to the public health, even though it be infected with the germs of disease.

In the second form named, that of dust, street dirt is, from the sanitary standpoint, wholly different from the first.

When the coarse material reaching the street is not removed with reasonable promptness it is subjected to the drying effect of the sun and air and to the pulverizing action of travel and is thereby reduced to a condition of powder so fine and light that it readily floats in the air when disturbed, and may be carried by winds or breezes to considerable distances. While thus suspended in the air it may be breathed into the lungs or deposited upon the bodies of those in the vicinity. It may float or be blown into dwellings, to be deposited upon articles of food, culinary utensils or chinaware, and thence be conveyed directly to the alimentary systems of the occupants, or it may settle temporarily upon the furniture, goods and fixtures of dwellings or business houses only to be again disturbed and set in action.

Assuming that this street dust is infected with disease germs, it is

obvious that the conditions could not be better for disseminating them and conveying them into susceptible human bodies.

The question whether, and to what extent disease germs exist in street dirt has been quite widely discussed. It has been argued by some that the infrequency of contamination and the comparatively small quantity of infectious material that reaches the streets makes street cleanings almost negligible as a source of disease. Unfortunately, we have very little reliable data on the subject. It is known that cultures from street dirt swarm with bacteria, but the writer is not aware that the bacteria of any specific disease has been definitely found therein.

Considering the known facts, however, one can hardly doubt the existence in street dirt of disease germs to an extent that can not be otherwise than dangerous.

In our American cities particularly, our streets are the common dumping ground of refuse and dirt from many sources. The cleanings from many dwellings and from most business houses are swept into the streets. That such sweepings often contain the germs of diseases emanating from sick rooms or from diseased persons occupying or visiting business houses cannot be doubted. The streets and sidewalks are the common receptacles of expectoration and are so used by many persons affected by mild cases of specific diseases, such as tuberculosis, typhoid fever, diphtheria and other infectious diseases, or just recovering therefrom. It is probable though not proved that the excrement of horses and other domestic animals may carry these germs. It is doubtless true, however, that the quantity of infected material thus reaching the streets is small as compared with the total volume of the street dirt, and it may often be wholly absent from large masses of the collected material; also the fact that infection is likely to result from the street dust only, which is but a small part of the whole, tends to diminish the danger. But in view of all the facts we can not avoid the conclusion that this street dust must often be the vehicle for propagating and spreading zymotic diseases.

If the views here outlined are accepted as true they indicate that important changes should be made in the present practice of street cleaning. Our efforts should be more particularly directed, first, to preventing the formation of street dust, and, second, to the removal by efficient methods and in a manner that will prevent its unnecessary dissemination, of such dust as may be unavoidably formed.

Heretofore in our American cities the principal object has been to remove the coarse dirt at such intervals of time as convenience or necessity might dictate by methods and apparatus not well adapted to removing the dust, which was largely allowed to remain on the street. If the quantity of dust became sufficient to cause discomfort when blown

about by the winds the streets were sprinkled with water to lay the dust. This was a palliative only, since but a small part of the dust was washed into the sewers and the remainder was left on the street to be again converted into dust when the intervals between sprinkling were long enough to allow the moisture to evaporate. Until quite recently the streets in all our cities were cleaned almost exclusively with coarse-fiber street brooms or the horsepower sweeping machine, and this practice still prevails on a great part of the streets in most cities and towns. As a means of removing the coarser dirt these methods are reasonably effective and would be quite satisfactory if the sweeping could be done at sufficiently short intervals. But where the streets of heavy travel, and consequently of large accumulations of refuse, are swept but once daily, or at longer intervals, and usually at night, the heat and travel during the day are sure to convert much of the dirt into dust which the coarse-fiber brooms stir up but do not satisfactorily remove.

It is true that the sweeping machines are usually preceded by the sprinkling wagon for the purpose, mainly, of preventing the clouds of dust that would otherwise be raised to the annoyance of those exposed to it, rather than to facilitate the removal of dust from the street. If not enough water is used to just moisten the dust and cause it to adhere and aggregate, most of it will remain on the streets, while if too much water is used the dust is converted into a paste which the brooms plaster upon the street surface to again be converted into dust under the action of the sun and travel.

For the purpose of removing the coarse accumulations, patrol or hand cleaning with broom or scraper, or both, is most efficient and satisfactory. This is true if for no other reason than that the dirt is more promptly and frequently removed. The cleaner passes over his beat several times during the day and thus removes the refuse before it has had much time to dry out and become pulverized.

For the removal of such dust as can not be prevented, the only effective and satisfactory way yet developed is to wash the surface with water. This may be accomplished either by the use of machines of the squeegee type, which scrub the surface, or by flushing with water under pressure to dislodge and carry away the fine material. For the latter, either flushing machines or hose attached to fire hydrants are available.

It is true that these methods if thoroughly used carry the removed dust into the sewers or drains, which is regarded by many as objectionable, and as likely to clog the pipes. This might happen where the whole of the street dirt, coarse and fine, is thus carried together into the sewers, though the writer does not know of any instances where actual trouble has thus resulted. The practice of cleaning the streets wholly by squeegee-

ing or flushing is not, however, to be recommended, if for no other reason than that it would be impracticable to do the work several times each day and thus prevent the formation and flying of dust.

The danger of clogging the sewers by flushing the dust only into them is very remote. The quantity of the dust remaining after proper coarse cleaning is small. Careful determinations by the New York Commission on Street Cleaning and Waste Disposal (1907) showed that on smooth pavements cleaned by the patrol system the accumulation of dust in forty-eight hours after the street had been washed either by hard rains or by flushing, does not exceed 5 or 6 per cent. of the total daily quantity of street dirt, though on rough stone-block pavement it may be much larger. This quantity is so small that its disposal through the sewers could hardly cause serious trouble. In fact the large volume of water used tends rather to flush and clean out the sewers.

It may be further objected that such disposal does not destroy the disease germs present in the dust and that the septic impurities in the sewage would thus be increased, but this could not occur to a dangerous extent, even where the sewage is discharged into streams or rivers, where dilution is ample and oxidation rapid.

If the views here outlined are sound, the theory and controlling principles of street cleaning may be summed up as follows:

1st. Street dust is the form in which street dirt is the most dangerous to the public health.

2d. From the sanitary point of view, therefore, the most important function of street cleaning is the prevention of the formation of street dust and the prompt and safe removal of any such dust as may accumulate on the streets.

3d. To prevent the formation of dust the coarse and usually moist excrement and refuse should be collected and removed as effectually and as frequently as practicable, before it becomes dried and pulverized. The most effective and satisfactory way of doing this is the patrol or hand-sweeping method.

4th. For the removal of the dust that will accumulate to some extent, scrubbing or washing the street surface with water is the only practical and effective method yet devised.

The ideal system of street cleaning would, therefore, be efficient patrol or hand cleaning through the day or during a longer period if the volume of travel in the evening requires it, and thorough scrubbing with squeegees, or washing with water under pressure by flushing machines or hose at night, as often as may be necessary.

It may be objected that the funds at the disposal of the street cleaning departments of most cities would not permit the adoption and adequate

application of this system in many American cities. To this it may very properly be answered that in matters seriously endangering the public health the question of cost should not be controlling, unless that cost be absolutely prohibitive, or wholly disproportional to the benefits that would result.

Actual experience, however, seems to prove that the method here recommended, that is to say, constant application of patrol or hand cleaning through the day followed by scrubbing or washing with water at night, need not be so expensive as to be discouraging.

The streets of Washington are notable for their cleanliness. The method here recommended has been in use for nearly two years with most satisfactory results both as to effectiveness and cost. In the report of the Street Cleaning Division for 1911 it is stated that in the neighborhood of one million square yards of street surface were cleaned every day except Sundays and holidays by the patrol system. The hand cleaning was supplemented by washing the surfaces about one and one-half times each week. The report states (Report of Street Cleaning Division, p. 5):

"Under the above system of street washing it is found that the streets are almost entirely free from dust. Any dirt which may accumulate does not have time to be pulverized and the particles are too heavy to be disturbed or blown about by an ordinary wind. Under the old method of sweeping these heavier and coarser particles were removed, but most of th· dust remained, to become a source of annoyance when disturbed by the wind or rapidly passing vehicles, although the streets might have appeared to the eye to be clean."

The cost of the work per one thousand square yards cleaned once is stated to have been as follows:

Hand Cleaning patrol system	$0.1753
Washing by Squeegee	0.1162

But as the washing was done on an average only one and one-half times per week the sum of the above figures do not give the correct average cost which, for 1000 square yards cleaned once, during a week (6 days) may be arrived at as follows:

Hand cleaning 1,000 square yards daily = 6,000 square yards per week @ 17.53¢. per m.	$1.052
Washing with squeegee 1,000 square yards 1½ times per week = 1,500 square yards @ 11.62¢ per m.	0.1743
Total for combined cleaning once of 6,000 square yards of street	1.1795
Equal to a cost per 1,000 square yards cleaned once of	0.1966

This figure seems very low, and probably could not be duplicated in many other cities where the business streets carry a much heavier travel, but it proves that this system of cleaning need not be unusually expensive.

The cost where the flushing machines were used is reported to have been 31.57 cents per 1,000 square yards cleaned once. Assuming that the streets were flushed one and one-half times per week, as in the case of the squeegee, the cost of the combined cleaning one of 1,000 square yards will be found to be 25.42 cents, which must still be regarded as a very reasonable figure.

It should be noted, however, that in neither case do these figures of cost include the value of the water used for washing. The quantity of water required per 1,000 square yards cleaned once as determined by trials in New York, is about 150 gallons for the squeegee and about 470 gallons for the flushing machines; but the cost of this water would be offset, in a measure at least, by the cost of that which would otherwise be used for supplemental sprinkling where the ordinary sweeping machine is used.

In order to keep this paper within reasonable bounds of space and time, I have dealt only with the sanitary aspect of street cleaning, but it should not be inferred that this is considered the only aspect of importance. Even if it were clearly demonstrated that unclean streets were not in any way deleterious to the public health, there would remain abundant reason for keeping them clean. Nor would that fact be likely to change the conclusions reached as to the proper method of cleaning the streets. From the viewpoint of public comfort and of economical considerations street dust must be regarded as the most objectionable part of street dirt. Its injurious effect upon foods and delicate household articles in dwellings, and upon the finer class of merchandise exposed in commercial establishments cannot be definitely estimated in money, but is undoubtedly very great, and the damage thus done would much exceed any additional cost that the more thorough cleaning here advocated might entail.

SOME FACTORS IN THE EPIDEMIOLOGY OF POLIOMYELITIS

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Read before the American Public Health Association, Washington, D. C., 1912.

Notwithstanding the brilliant work of the last three years upon the experimental transmission of poliomyelitis, and the numerous painstaking epidemiologic studies of the disease, there remains, in the minds of practically all who have studied the subject, considerable doubt as to the means by which this infection is actually disseminated in nature. The explanation of this uncertainty is to be found, not in the incompleteness of the experimental work, nor altogether in the paucity of epidemiologic data, but rather in the seeming lack of harmony between experimental results and epidemiologic observations.

Experimentally it has been shown that poliomyelitis is an infectious disease, due to a filterable virus, easily, almost constantly transmissible to monkeys. It has quite recently been shown that the virus which is the specific infective agent may be present in the discharges from the naso-pharynx, the trachea and the intestines of persons suffering from poliomyelitis. It has also been shown that monkeys may, though not constantly, be infected through the nasal mucous membrane, and under somewhat artificial conditions, through the mucous membrane of the gastro-intestinal tract.

Lower animals other than the monkey have not been found susceptible to laboratory infection with poliomyelitis, with the exception of the rabbit, in which an atypical form of the infection may occasionally be produced.

The virus of poliomyelitis has been found, in nature, only in the organs and discharges of persons suffering with or recently dead of the disease.* To this statement there is one exception, namely, the finding of the virus in the dust of a room occupied by a patient suffering with poliomyelitis. The dust was presumably contaminated with the discharges from the patient and attendants.

The experiments showing the infectiousness of the discharges from patients and the possibility of infection taking place through mucous membranes not grossly injured, form a very convincing chain of evidence, if not actual proof that the disease is, in nature, transmissible directly from person to person.

The doubt as to whether this is the real means of transmission in nature

* See note at conclusion.

has arisen because of the fact that even in epidemics poliomyelitis does not usually exhibit the characteristics which we are accustomed to attribute to contagious diseases.

Making due allowance for rather numerous exceptions, the well-established epidemiologic characteristics of poliomyelitis are the following:

1. It has, both in epidemic and sporadic form, an extremely wide, not definitely defined geographic distribution, occurring all over the North American Continent, throughout Europe, in Australia, and quite probably in various other countries from which it has not been specifically reported.

2. While it has a distinct seasonal prevalence, it is not strictly limited in the season of its occurrence. The great majority of sporadic cases and practically all epidemics in the North Temperate Zone occur in the late summer and fall months, but cases do occur, in this latitude, in all months of the year. No well defined set of weather conditions can be said to be necessary to the occurrence even of epidemics.

3. Although we refer to poliomyelitis as "epidemic," its incidence in any large population is always small even during epidemics. Occasionally, in a small group of people, a large percentage may be attacked, but considering any large group, as the population of a city, a county or a state, the attack-rate, even in so-called epidemics is seldom more than one per thousand, usually even less.

4. As regards its incidence in various classes of the population, poliomyelitis occurs with approximately the same relative frequency among those living under the best of sanitary and hygienic conditions as among those living in the most squalid environment. It is a disease not closely associated with so-called unsanitary or squalid conditions of living. It is, indeed, a very general rule, both in this and other countries, that epidemics have been more intense and more virulent in thinly-settled rural and village communities where living conditions are fairly good than in the overcrowded slums of great cities.

5. In one respect, however, poliomyelitis is strikingly selective in its attack-rate upon a population, namely in that the vast majority of its victims are young children, from fifty to eighty per cent being under six years of age. Adults, though not exempt, are rarely attacked except during intense epidemics, where a relatively large part of the whole population is attacked. It would appear that among adults males are more frequently attacked than females.

6. Epidemics apparently spread with great rapidity or else occur independently over wide areas of country at about the same time. The New York epidemic of 1907 was accompanied, or rather followed by an outbreak in New England, reaching its maximum about a month later than in New York. Records of the epidemic of 1910 in Iowa show a fairly uniform radial spread from a primary focus in the north-central part

of the state to more distant parts. For example, there was a small epidemic in Hancock county in April and May. A considerable epidemic occurred in Mason City, in the adjoining county (Cerro Gordo), beginning in May and declining in August. In the county around Mason City the outbreak reached its maximum in September. In Grundy county, not far from Mason City, an epidemic occurred in August and September; and finally in Sioux, Woodberry and Plymouth counties, in the extreme west of the state, there was an epidemic in September, October and November.

7. As regards the epidemiologic evidence of contagiousness, it has usually been impossible, even in epidemics, to trace lines of contact from case to case. While some small epidemics have, indeed, shown all the characteristics of contagious disease, and while it is possible in almost every closely studied outbreak to find instances of apparent contact-infection rather more often than could be accounted for by coincidence, it is characteristic that the cases are scattered, occurring in persons who have never been in any sort of direct or known indirect contact with a previous recognized case. Not infrequently the patient is a child living far away from the nearest known previous case, and who has certainly not been away from home within a period of several weeks before the attack. Still more striking evidence of the non-contagiousness of poliomyelitis is afforded by the fact that one rarely finds more than a single case in a family, and still more rarely finds multiple cases in a family separated by such an interval as would suggest the infection of one from the other. Numerous instances can be cited where large numbers of children have been exposed in schools or institutions, to acute cases of poliomyelitis without the development of any secondary cases.

On the whole it may be confidently asserted that infection in the majority of cases of poliomyelitis can not be ascribed to direct contact with any previous recognized paralytic case, or any recognizable abortive case of the disease. Indeed, the fact that poliomyelitis occurs most commonly in young childen, the very class least exposed to contact with people outside their own family, is, of itself almost sufficient to exclude direct contact as a necessary or even highly important factor in the infection.

Taking a broad view of an outbreak of poliomyelitis such as has occurred in many of our states within the last three years, we have the picture of an infection becoming, within a very short time, disseminated over a wide area of country, attacking, however, only a very small percentage of the population of this area, attacking chiefly children under five years of age.

These points I may reiterate: the rapid spread over a wide area, as the whole of a large city or even a state; the rare incidence of the disease within that area, seldom as much as one case per thousand inhabitants; and finally, the enormously disproportionate incidence among children.

To account for this picture we must assume either an infective agent so distributed as to reach only one out of several thousand inhabitants, and reaching children much more commonly than adults; or we must assume an infection quite generally disseminated throughout the population of this area, but only rarely finding an individual in whom it can produce characteristic morbid effects. Granting an almost uniform and universal susceptibility to infection, then the incidence of the disease must be approximately coincident with the distribution of the specific causative agent.

Several hypotheses have been advanced to explain the irregular distribution of poliomyelitis, and in the present state of our knowledge, each of these deserves careful consideration.

It has been suggested that the lower animals are the chief reservoirs of infection, which is spread from them to man. Again it has been suggested that the dust of streets and barnyards is the chief source or vehicle of infection, and finally the suggestion has been repeatedly made that some insect is a necessary factor in the transmission of poliomyelitis. Each of these hypotheses has, in its support, certain facts which cannot be discussed within this space. None of them, however, adequately explains the rare incidence of the infection, the scattering of cases and the disproportionate incidence in children, without the additional assumption that the majority of persons are not susceptible to the infection. Whether the source of infection is the soil, domestic animals or man; whether the infective agent is spread from its source by dust, by insects, by domestic animals or by human carriers, speaking broadly it will be spread radially, so that as a very general rule those nearest the source will be most exposed to the infection. The grouping of cases in the immediate vicinity of the source of infection is especially striking in the epidemic diseases which we know to be transmitted from animals, or to be conveyed by insects, as, for example, in glanders, in plague, in yellow fever and in typhus fever. Again, none of our epidemic diseases known to be derived largely from domestic aminals or transmitted by insects is distinctively a children's disease. There is good reason to believe that adults are proportionately quite as much exposed to infection from these sources as are children.

Therefore, in order to make any of the above hypotheses competent to explain the epidemiology of poliomyelitis, we must couple with it the assumption that susceptibility to the infection is relatively rare, and that children are more susceptible than adults. In short, no hypothesis yet advanced is sufficient to account for certain characteristics of poliomyelitis, namely, its wide distribution, small total incidence and preponderance in children, unless coupled with the assumption of a large factor of variations in individual susceptibility.

On the other hand, granting, as appears necessary whatever the vehicle

or source of infection, that the peculiar incidence of the disease is dependent largely upon variations in individual susceptibility, then its spread by personal contact is readily explainable, in harmony with the facts shown experimentally and closely analogous to what is known of other diseases whose epidemiology has been more thoroughly worked out.

Cerebro-spinal meningitis furnishes an excellent example of a disease which we now feel reasonably assured is disseminated by personal contact, but in which lines of direct contact are no more traceable than in poliomyelitis. It is only by laboratory methods that the mystery of the spread of epidemic cerebro-spinal meningitis has been solved. In recent years it has been demonstrated that a large number of the persons in communities where this disease is epidemic, harbor the meningococci in their naso-pharynx, without developing symptoms of meningitis; in other words, the infective agent of cerebro-spinal meningitis is apparently very widespread during epidemics, but the incidence of the disease is limited by the insusceptibility of the majority of people. The demonstration of meningococcus "carriers" serves, in this instance, to prove that susceptibility to the infection is relatively rare. In poliomyelitis, carriers have not yet been demonstrated,* but the epidemiological characteristics are those which we should expect of a carrier-borne disease. And it is these general characteristics, rather than individual instances of apparent infection by indirect contact, that lend probability to the idea of "carriers" forming the missing links in the spread of the disease by contact.

The two diseases are analogous in their constant endemic occurrence in sporadic form and their occasional occurrence in epidemics, which are characteristically of irregular distribution. They are further analogous in their comparatively small incidence in the total population, their preponderating incidence in childhood, the scattering of cases with no obvious lines of contact, and in the fact that each has a distinct though not absolutely limited seasonal prevalence.

To recapitulate, it is not the object of this paper to deduce a definite conclusion as to the means by which poliomyelitis is disseminated in nature. The facts do not appear as yet to warrant a final conclusion. It has been intended, however, to point out that of the hypotheses which have been so far advanced none is capable of explaining the epidemiologic facts without ascribing to individual variations in susceptibility a very important role in determining the incidence of the infection. Granting this, and taking into consideration the laboratory evidence of the contagiousness of poliomyelitis, the most probable hypothesis would appear to be that the disease is transmissible by contact,—by transfer of infectious discharges from person to person,—the lines of contact being ob-

* See note at conclusion.

secured by the interposition between recognized cases of insusceptible persons who become "carriers."

As to what constitutes susceptibility we are as yet ignorant. Epidemiologic studies should aim to collect data on this point by more intensive studies of the persons affected. If we can ascertain the conditions which determine susceptibility and immunity to this infection, it may be that we will be able to accomplish something in the way of prevention. If not, it must be admitted that the idea of transmission above suggested carries with it a rather pessimistic outlook as to the possibility of prevention.

Author's Note.—Since this paper was presented several highly important contributions have been made to our knowledge of experimental poliomyelitis. Kling, Wernstedt and Petterson, who had previously shown the infectiousness for monkeys of the naso-pharyngeal, tracheal and intestinal secretions of persons acutely ill with poliomyelitis have more recently announced that they have been able to demonstrate the virus in the buccal and intestinal secretions of well persons who had been closely associated with paralytic cases of poliomyelitis. In the monkeys infected in this way they were, however, unable to demonstrate the infiltrative lesions of the cord which have been considered characteristic of poliomyelitis. More recently Flexner, Clark and Fraser have demonstrated, beyond a question, the presence of the poliomyelitic virus in the naso-pharyngeal discharges of two apparently healthy adults closely associated with a case of poliomyelitis. Thus experimental proof has been adduced of the occurrence, in passive human carriers, of the virus of poliomyelitis.

Rosenau and Brues have shown that poliomyelitis may be experimentally transmitted from monkey to monkey by the bites of Stomoxys calcitrans, and their observations have been confirmed by Anderson and Frost.

Finally, Flexner and Noguchi have succeeded in cultivating in vitro the virus of poliomyelitis.

The additional evidence brought forward since this paper was prepared, while demanding a more careful consideration of biting insects, especially Stomoxys calcitrans, as possible agencies in the natural transmission of poliomyelitis, does not appear to the writer to necessitate any material change in the general conclusions above given.

SEASONAL DISEASES AND SEASONAL TEMPERATURES.

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Read before the American Public Health Association, Washington, D. C. September, 1912.

My subject is so large that it is necessarily one which can be treated only in general outline in the brief time at my disposal. The writings on various branches of this subject have been voluminous, and the principal facts connected with Seasonal Diseases and Seasonal Temperatures are well known. In this paper I shall only attempt to assemble some of these facts into new groupings, and to point out the interpretation which these groupings suggest.

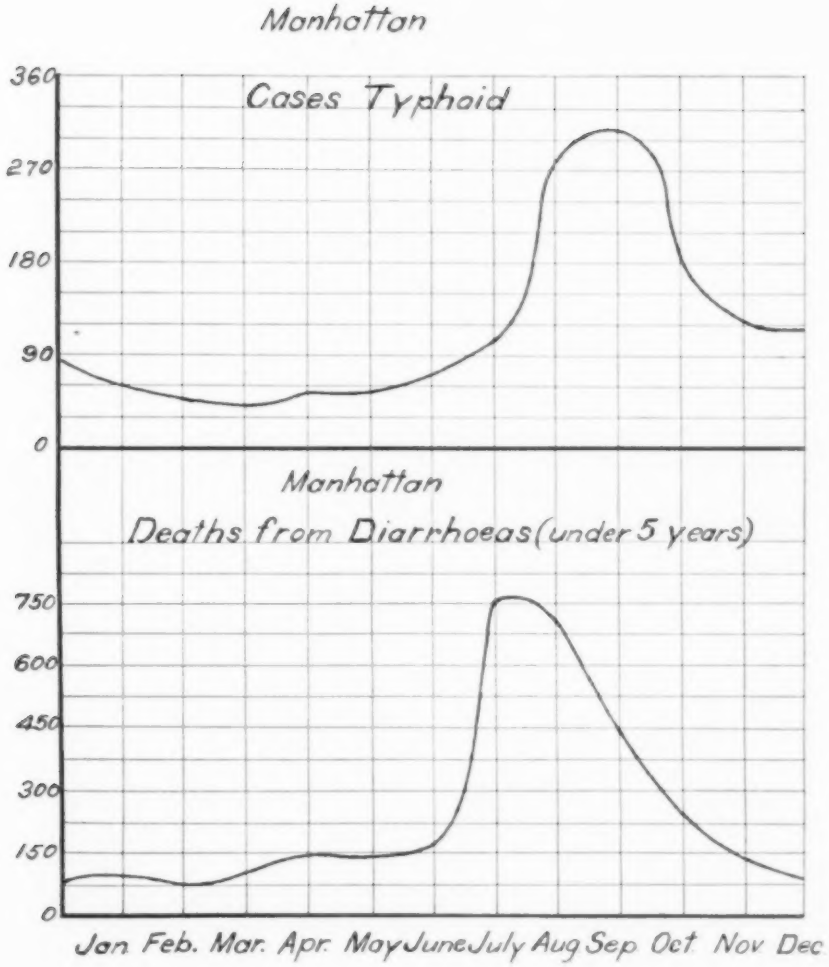
The majority of writers have not discussed the subject in its broad aspect, but have confined themselves strictly to the discussion of a single disease. Thus, there are numerous papers on Summer Diarrhœas of Infants, and on Typhoid Fever, and on Pneumonia, but there is but little literature devoted to pointing out any relation between these diseases because of their seasonal occurrence. On the other hand, the majority of writers have been chiefly interested in the bacteria or sources of infection and the means of transmission, and have devoted but little attention to a consideration of the effect of seasonal temperatures on the powers of resistance in the individual. While limiting their writings in these respects, yet a number of authors, especially in the discussions of the seasonal occurrence of typhoid fever, have come to the conclusion that there are certain broad underlying causes of the seasonal prevalence of this disease which have not yet been recognized. The chief purpose of this paper is to suggest that these broad influences relate to the effect of temperature on the powers of resistance in the human body and that they effect not only the seasonal prevalence of typhoid fever but of all other seasonal diseases.

The changes in the character of disease following seasonal changes in climate are greatest in the Temperate zones. Vital statistics in all large cities, both in the North Temperate Zone and in the South Temperate Zone, show the same annual rise and fall of cases and deaths in a number of important infectious diseases. There is a general regularity and parallel change shown by these vital statistics, so that those from any one of the larger cities will serve to illustrate the character of these changes. A survey of vital statistics shows that seasonal changes occur in three great groups of diseases. In the summer time and early fall, there is a rise both in adults and in infants in the number of cases and deaths from infections

I

Intestinal Diseases

1908



occurring through the intestinal tract. In the cold months there is a rise in cases and deaths from infections through the respiratory tract. In late winter there is a rise in the number of cases and deaths from infections which take place in the skin. As an illustration of these facts I show tables, Nos. 1, 2 and 3, which are taken from the vital statistics of the Borough of Manhattan, N. Y., in the year 1908.

Chart No. 1 shows the chief intestinal diseases both of which exhibit a marked increase in the number of cases and of deaths during and immediately after the warm weather. It is interesting to notice that the crest of the wave in typhoid fever is about a month and a half later than the crest of the wave in infant diarrhœas. Both of these waves reach their low point in January, February and March.

Chart No. 2 illustrates cases and deaths from inflammations of the respiratory tract and shows a wave which begins to rise in October and which reaches the crest in January, which continues until the latter end of March when the curve starts downward and reaches its lowest point in August.

Chart No. 3 exhibits the seasonal prevalence of diseases which are classified as Exanthemata—all of these cause skin eruptions. It is recognized, however, that the infection has its origin in the mucous membrane of the throat and later on displays itself in the skin.

It is interesting to notice that while the three diseases charted begin to rise in October and November and advance upward during December and January, that the crest of their prevalence is not reached until the month of March, somewhat later than the diseases listed in chart No. 2.

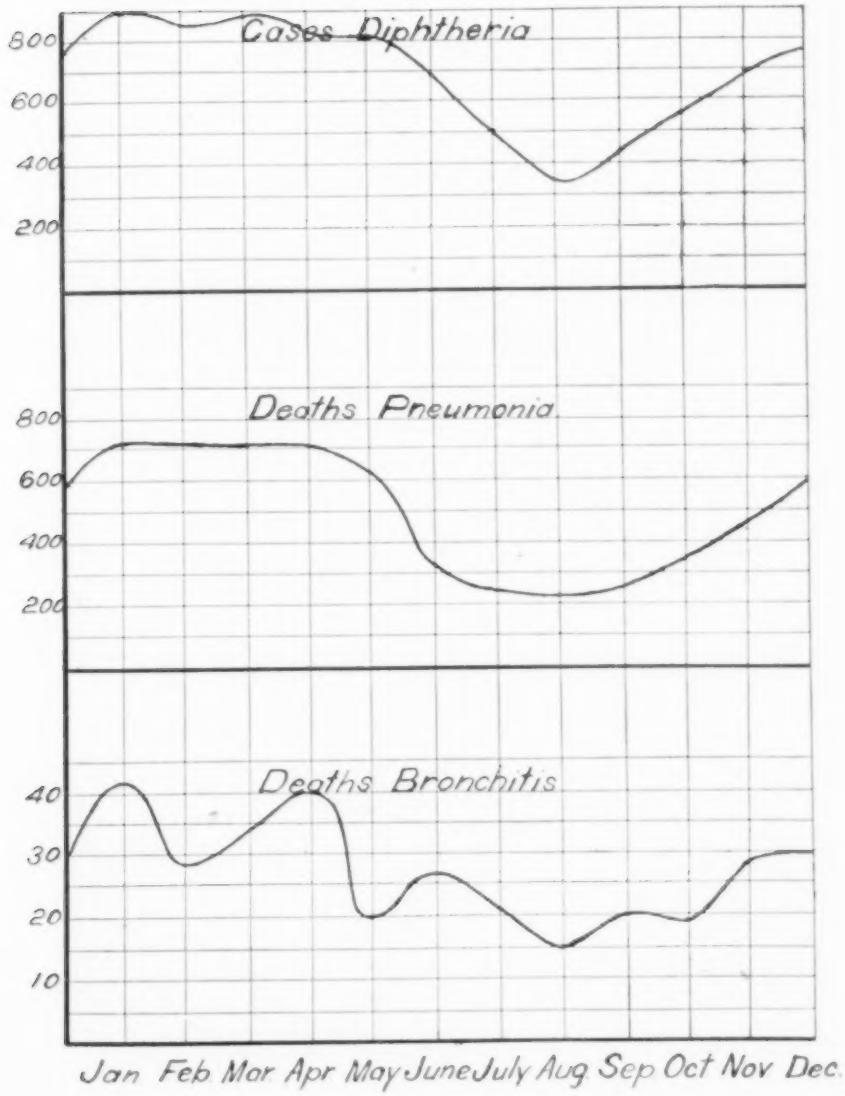
While there are modifications of the waves shown in these charts from year to year and from different cities, yet in a general way these charts correctly represent the rise and fall in both the North and South Temperate Zones of the three great classes of diseases caused by infections of the intestinal tract, the respiratory tract and the skin.

One cannot consider this annual rise and fall of diseases of this type without feeling certain that they bear some relation to the annual changes of climate which regularly take place. It is worth while to consider for a moment the relation existing between the sun and the earth and just what are the seasonal changes in their relations from the standpoint of the astronomer. In chart No. 4, is shown a diagram of the position of the sun and the earth in the summer time in the North Temperate Zone. At this period the sun is directly opposite a point $23\frac{1}{2}^\circ$ north of the equator. The direct rays of the sun, therefore, shine in the territory north of the equator, and the situation is one in which for a few months at least the tropical climate is moved north. The oblique rays of the sun which do not strike

II

Respiratory Diseases

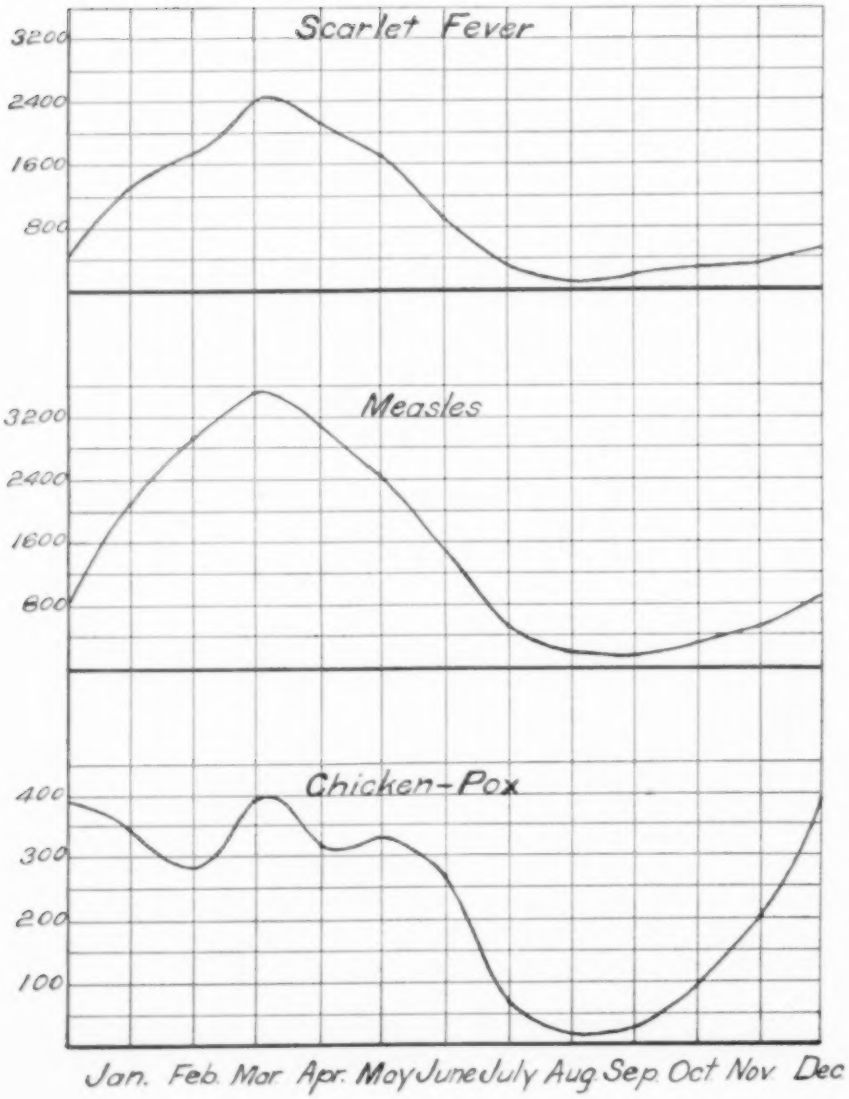
Manhattan
1908



III

Skin Diseases

Cases in Manhattan
1908



the earth directly cover those portions of the earth's surface in which the climate is cool and in which the winter season prevails. During the period of the year that the chart represents, the cold climate of the south polar region has crept northward and invaded the South Temperate Zone. In the Northern Hemisphere the cold climate has also crept northward until it is practically limited to the northern Artic region.

In these zones of temperature we find corresponding zones of disease. Thus in the chart, the portion of the earth receiving the direct rays of the sun in the North Temperate Zone is suffering from an increase in intestinal inflammations. On the other hand, the South Temperate Zone, which has been invaded by cold from the southern polar region, suffers at the same time from an increase in respiratory and skin diseases. It is obvious that there are certain zones in which extreme conditions are fairly constant. In both of the Arctic Zones the temperature is constantly cold, and in the Torrid Zone it is constantly hot. There is no space to discuss the conditions prevailing in these regions, but, in passing, it may be suggested that the constancy of extremes of cold on the one hand, and of heat on the other, may tend to develop a considerable degree of immunity to the effects of these conditions upon the inhabitants of these regions.

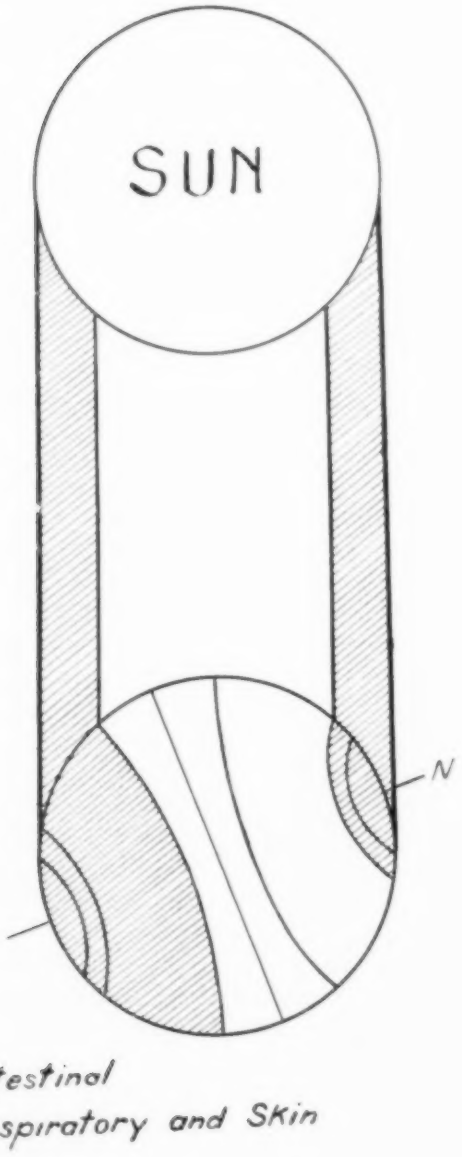
It must be admitted that temperature changes are by far the most prominent characteristics of the changing seasons. Humidity is, without doubt, also a factor, but this is secondary to temperature. There are three relations of temperature to seasonal diseases, and each must be considered separately. First, there is the relation of temperature to human beings; second, there is the relation of temperature to the infectious agent itself, or to the bacteria causing infectious diseases; third, there is the relation of temperature to the means of transmission of the infectious agents from their sources to the bodies of men. I cannot undertake to present all three phases of this question, and will confine myself chiefly to the relation of temperature to human beings.

It is recognized that there is a certain normal temperature in which the human body conducts its processes to the best advantage. There are temperatures which are too high and there are temperatures which are too low for normal life. When the surrounding temperature is either above or below the normal, the human body attempts to adjust itself to these changes by the alteration of certain internal physiological processes. During warm weather the human body tries to rid itself of excess heat, or in other words, tries to keep cool; during cold weather the body tries to prevent the loss of heat to keep warm. These adjustments are accomplished as follows: During warm weather moisture is evaporated from the surface of the skin and from the surface of the respiratory tract, and thereby excess

IV

Sun and Earth

Summertime North Temperate Zone



heat is released. At the same time the intestinal tract reduces its absorption of food products and increases its absorption of liquids. The body does not require the number of calories of heat, which it obtains from large quantities of food. The intestines and digestive organs cease to work at full power and heat production is reduced.

In warm weather the intestinal capillaries are closed down to a considerable degree, while the capillaries of the lungs and skin are largely expanded. When the blood supply is at its maximum in any tissue, its powers of resistance are at the maximum. The bacteria of infectious diseases find it more difficult to invade the tissue in which the capillaries are expanded to their full power than to attack the tissue in which the capillaries are shrunken and from which the blood supply has been taken. Thus, the first step in inflammation is congestion, which means that the irritation caused by the attack of the bacteria, or other irritant, is being opposed by the automatic action of the capillaries which bring a rush of blood to that part as a defence against the attack.

During warm weather the lungs and skin are filled with blood due to the expansion of the capillaries in those parts, and consequently the powers of resistance of the surface of the skin and of the respiratory tract are at the maximum. On the other hand, the intestines have shrunken capillaries because their activities are reduced and consequently the powers of resistance of the surface of the intestines is greatly impaired. Students of infant mortality have often mentioned their belief that the summer diarrhœa of infants is due to the paralysis of the intestines during the hot days. Digestive inactivity shows itself in loss of appetite during hot weather in adults as well as in infants.

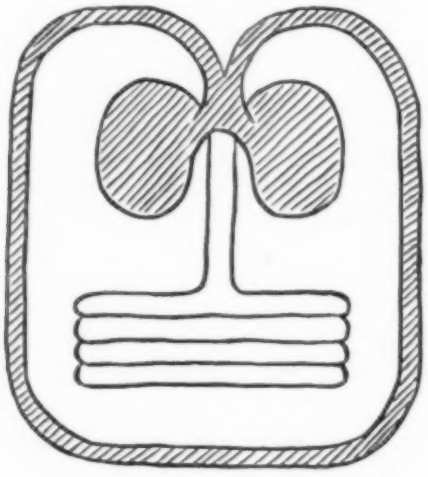
In winter just the reverse conditions prevail. During cold weather it is necessary for the body to supply itself with an abundance of heat through its food. Consequently, the digestive organs are working at their full capacity and the capillaries of the intestines are fully expanded. Heat production is at its maximum. On the other hand, loss of heat through the surface of the skin and of the respiratory tract is prevented by the shrinkage of the capillaries of those parts, so that evaporation is reduced to its lowest terms. As a consequence, the powers of resistance of the skin and the respiratory tract is relatively reduced, while the power of resistance of the intestines is greatly heightened.

This, in brief outline, suggests the chief reason for the seasonal waves of the three great classes of infectious diseases. Such a broad generalization as this may seem somewhat daring, and it is with some degree of timidity that I advance it. The argument in its favor, however, depends not only on the fact that intestinal diseases are increased in the hot season, but that

respiratory and skin diseases are decreased at the same time. In the same manner the argument is strengthened by the fact that in the cold weather respiratory and skin infections are not only increased, but intestinal infections are decreased at the same time. In other words, not only the crests of the waves, but also the hollows of the waves furnish the evidence.

The seasonal ebb and flow of blood in the capillaries following seasonal changes in temperature are illustrated in Charts Nos. 5 and 6.

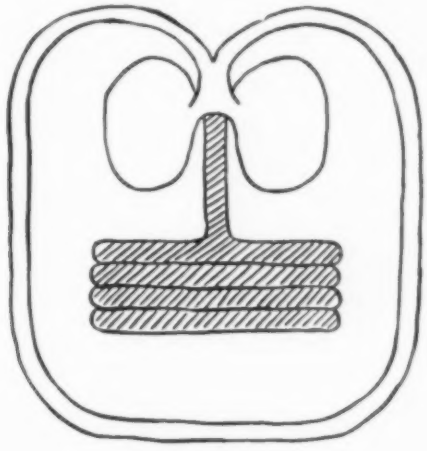
Chart No. 5 shows the summer blood supply in which there is congestion in the respiratory tract and skin, with pallor in the intestines. Chart No. 6 shows the winter blood supply in which there is congestion in the digestive tract and pallor in the lungs and skin.



V. Summer Blood Supply.

I will touch only briefly upon the effect of temperature on the sources of infection. Bacteriologists are more and more satisfied that the chief sources of infectious diseases lie in the chronic carriers of the infectious organisms. Tuberculosis carriers have been known the longest. Typhoid carriers within recent years have become well recognized. Diphtheria carriers are beginning to be discovered, and eventually carriers of every infectious disease may be shown to exist. The chronic carriers who keep the infectious organisms in their bodies and dwell among us unrecognized, carry the infectious agents onward from season to season and are the real sources of the annual outbreaks and waves of infectious diseases. If what has already been said in this paper is true of those persons who are in good

health and normal condition, the same seasonal capillary changes must take place in the chronic carriers of infectious diseases. In other words, there must be certain seasons of the year when those who are chronic carriers of infectious diseases find conditions where the bacteria which they carry are more easily multiplied and in which their diseased condition is exaggerated, while there are other periods of the year when the bacteria which inhabit these carriers are met with a vigorous resistance in the tissues in which they are located and are consequently greatly reduced in their numbers and activities. Personally, I have had only one opportunity to test this theory experimentally. On a typhoid carrier tests made daily for almost the entire month of February showed that on only one



VI. Winter Blood Supply.

day was it possible to secure typhoid bacteria from his intestinal discharge, and then only in very small numbers. Tests from this same carrier in September and October showed large numbers of typhoid bacilli on consecutive days during a period of three weeks.

The effect of temperature on the means of transmission must be dismissed with scarcely a word. In general, intestinal diseases are transmitted by food and drink while respiratory and skin diseases are transmitted by air. I will only take space to suggest that the great increase in motility of human beings as a result of warm weather multiplies the risks from foods and drinks, and also that the quantity of liquids consumed is greatly increased. On the other hand, cold weather reduces human motility, re-

duces the number of risks from foods and drinks, and at the same time leads to indoor confinement and the breathing of polluted air.

This short paper is really a preliminary note and outline of an argument based on material which has been collected during the past two years, and which will be used for a larger publication on the same subject in the near future.

THE USE OF BISMUTH SALTS IN MEDIA TO DETECT THE FORMATION OF SULPHUR BODIES OF BACTERIAL ORIGIN.

A Preliminary Note.

SAMUEL T. DARLING,
Ancon, C. Z.

During an investigation of the effect of bismuth subnitrate on intestina bacteria and pathogenic entamœbæ, I observed that the stools which became quite black after the administration of large quantities of the drug contained many crystals of bismuth subnitrate, the surface of which had become coated with bismuth sulphide. The crystals of bismuth subnitrate were not disintegrated but had taken up the hydrogen sulphide generated by the intestinal bacteria. In addition to this, I was struck by the enormous numbers of micrococci and bacteria which were jet black in color evidently due to the absorption or assimilation of bismuth and its conversion into sulphide.

On account of the facility with which bismuth subnitrate is sulphuretted by certain micrococci and bacteria, it was thought that it might be used to advantage for the detection of sulphide-formers among water bacteria and for the detection of sulphur bodies of bacterial origin, and a series of comparisons was made with bismuth and lead acetate media. It was seen that bismuth subnitrate broth possessed certain advantages over broth prepared with lead acetate as usually advised for the detection of sulphide-forming bacteria, for a number of microörganisms were stained black or stained the media brown or black in bismuth broth, which exhibited no such changes in lead acetate broth. Inasmuch as the object of the lead acetate media is to demonstrate by a color reaction the formation of hydrogen sulphide by a microörganism, it would seem that if bismuth has a wider or different range of usefulness for this purpose, it should be employed instead of lead or in combination with it. I can find no references in the literature at hand to the use of bismuth salts for this purpose.

Apparently, intestinal micrococci and bacteria, particularly those concerned in putrefaction, have this power developed to a considerable degree. Their cytoplasm may contain notable amounts of protoplasm containing sulphur in such a linkage that bismuth sulphide is formed with some avidity. On the other hand, these or other microörganisms may excrete hydrogen sulphide into the media and thus lead to the staining of the medium with black or brown bismuth sulphide.

A large gray rat was killed and the stomach tied off from the rest of the intestinal tract. About two inches of the small intestine and two inches of the colon were similarly tied off. Each chamber was injected with a suspension of bismuth subnitrate in distilled water. The intestines were replaced and the rat placed in an incubator. After twenty-two hours, there were no evidences of bismuth sulphide in the stomach (acid reaction), but in the small intestine and colon the bismuth had become blackened. This suggests that the reaction takes place in a neutral or alkaline medium with bacteria of fœcal type.

The action may be of two kinds. Hydrogen sulphide or sulphur radicals may be liberated from the bacillus into the media. In this event the media is stained. Or the blackening may be due to the intra-cellular assimilation of bismuth and the intra-cellular formation of bismuth sulphide, when the microörganism itself is stained.

The bismuth subnitrate broth was made up in two strengths 0.1 per cent. and 2.0 per cent., *i.e.*, bismuth subnitrate added to bouillon in these proportions. Two per cent. broth is not inimical to the growth of most bacteria.

The typhoid colon group as far as was investigated did not give the reaction, for *B. typhosus* and *B. paratyphosus*, A. and B. were inoculated into bismuth broth 2.0 per cent. yet bismuth sulphide was not formed at the end of twenty-two days and sub-cultures were viable.

Intestinal bacteria recovered from Endo plates made from stools were transferred to bismuth subnitrate and lead acetate broth 0.1 per cent. The bismuth broth after twenty-four hours showed a black deposit, which upon microscopic examination was seen to be due to a staining of the bismuth in the media, for the bacilli were quite colorless. Here the bacillus is excreting hydrogen sulphide. When stained, the bacillus is seen to be Gram positive, thus showing that there is no relation between the gram staining and bismuth staining. After a lapse of sixteen days, the bismuth broth was quite black and microscopically contained many blackened bacilli and much blackened bismuth subnitrate. The lead acetate broth showed some bacteria stained brown, though not so many, nor were they so deeply colored as in the bismuth broth, but there was much brown lead sulphide.

Several colonies from Endo plates gave a black sediment due to sulphuretted bismuth subnitrate, while the bacilli present were colorless and Gram positive.

Samples of water from the Zone reservoirs having a sulphurous odor on standing were inoculated into bismuth and lead acetate broth. After twenty-four hours, the sediment in the lead tubes was slightly darker than that in the bismuth broth although both were well stained. After several weeks, the tubes were equally discolored although the bismuth tubes

contained many black stained cocci while the lead tube contained many colorless bacilli.

Forty-one colonies from plates of fæces were inoculated into bismuth broth 0.1 per cent. Forty out of the 41 grew in the media, which became brown or black during a period of seventeen days, and the reaction in all was alkaline.

Eleven gelatine liquefying colonies from fæces were inoculated into 2 per cent. bismuth broth. All the tubes developed an alkaline reaction. Nine were blackened, while the color of two was unchanged, and the black color microscopically was due to the blackening of the entire microörganism or to certain granules within it.

The reaction with Bismuth is noted fairly constantly among micrococci. When bacilli are blackened, it may be done *en masse* or by deposition in the ends or in excentrically placed granules. Sometimes as in bacilli of the *Aerogenous capsulatus* type, the spongioplasm of the bacillus is marked out in black, suggestive of the picture seen when these bacilli are stained by Gram and overwashed with alcohol.

The black staining of bacteria grown in bismuth broth is not a reaction with metachromatic granules for several cultures of *B. diphtheriæ* were inoculated into bismuth and lead acetate broth, and, though the growth was positive, yet scant, there was no blackening of either broth or bacilli.

The bismuth reaction is noted oftenest when the reaction of the broth has become quite[1] alkaline.

The black granules are not spores, for *B. anthracis* was grown for two weeks in 0.1 per cent. bismuth broth without definite blackening of the bismuth, and the bacilli and spores remained colorless.

The observations noted here it is believed will be of value in connection with the detection and study of microörganisms which liberate H_2S, or which assimilate bismuth in such a way that bismuth sulphide is formed intracellularly. The phenomenon may have a range of application aside from the detection of sulphide-formers and may be utilized for the differentiation of species as well as in connection with questions relating to the physiology of bacterial protoplasm and the assimilation of salts of heavy metals.

These observations also lead one to the opinion that the staining of bismuth subnitrate and lead acetate media is not always due to the excretion of hydrogen sulphide as is generally believed, but may also be due to the assimilation of these heavy metals by certain microörganisms and the formation of metallic sulphides, by sulphur not necessarily existing as hydrogen sulphide but due to the intracellular splitting off of sulphur or sulphur bodies by hydrolysis autolytic or other enzyme action.

[1] Johnson, T. B., Jour. Biol. Chemistry, 1911, IX, 442, 443, in discussing sulphur linkages in proteins notes "that proteins and cystine are decomposed by alkali with formation of alkali sulphide . . . and that it is not inconceivable that in the digestion of proteins with alkalies there may be atomic displacements involving the removal of unsaturated sulphur, as in C = S which can even occur before the cleavage of the protein itself and the liberation of the cystine molecule."

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NEW YORK PUBLIC HEALTH COMMISSION.

A particularly interesting and important document is the report of the Health Commission appointed by the governor of New York to inquire into the public health situation of that state with a view to recommending improvements in the sanitary laws and their administration.

As was to be expected, particular attention is paid to the situation in the rural districts where the mortality rate has not declined as rapidly as in the cities and has for some years stood at a higher point than the urban death rate.

The commission makes many recommendations, of which the most important are for lengthened tenure of office and increased compensation of the State Health Commissioner; the creation of a Public Health Council, which shall have the power to adopt a sanitary code for the state outside of New York City, but without administrative authority of any kind;

the establishment of not less than twenty sanitary districts in the State outside of New York City with an expert sanitary supervisor in each, devoting his full time to the work and appointed by and responsible to the State Commissioner of Health. These recommendations all point toward the closer supervision of health administration by the State Department of Health and with authority sufficient to insure results.

The commission further recommends that the duties of health officers of towns and villages shall be specifically defined and a minimum compensation fixed. There are also included recommendations for the improvement of the vital statistics, the extension of visiting nursing under official auspices, strengthening of the tuberculosis law and increased provision for tuberculous patients, the development of work in child hygiene, the extension of the State's laboratory facilities, the regulation of midwifery and wide extension of the educational activities of the State Department of Health.

It is recommended throughout that the proposed plan shall not deal with New York City, but that no other territorial exception be made. This exemption simplifies the problem and is probably a wise one.

The report has been transmitted to the Legislature with a strong recommendation from Governor Sulzer that its provisions be enacted into law. The entire country will watch its progress with close attention.

While the commission was forced to make its investigations and formulate its recommendations in a very short time and recognizes that certain points of importance remain for future investigation, the report as it stands is a most valuable contribution and, if its recommendations be carried out, the State of New York will be placed in a position to accomplish more in the public health field than any other commonwealth in the country.

SPECIAL NOTICE TO MEMBERS OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.

A revised list of membership of the American Public Health Association is now being printed. The Secretary earnestly requests that he be notified at once of any changes of address or other alterations, so that the list may be accurate.

THE IMPORTANCE OF NEGATIVE EUGENICS OR THE PREVENTION OF ILL-BORNNESS.

DR. WOODS HUTCHINSON,
New York, N. Y.

Read before the American Public Health Association, Washington, D. C., September, 1912.

Eugenics is the art of the intelligent selection of our own parents. Unfortunately, most of us were not consulted as we should like to have been, about that matter, but we can see that the next generation is to some degree consulted. The problem of the method of preventing some of the unfortunate results which we see about us on every hand is one of the most vital and important things that confront us, not merely as sanitarians, but as humanitarians and as lovers of our kind. In the beginning, as most of you are aware, the direction taken by the eugenic movement, started under the brilliant and able leadership of Sir Francis Galton, was toward careful promoting of the mating and reproduction of the especially and peculiarly fit. That raised the question as to who should decide who were the specially and peculiarly fit, who were to be endowed and bowed down to by the rest of the community, and not unnaturally, those who first began this movement selected their own class as the class that ought to be so endowed. And from that point of view, eugenics began. There were to be special classes of individuals and careful study was made, statistical study, if you please, showing how much more valuable, how many times more valuable to the community the child of a professional man or a well-to-do merchant was than the child of a day laborer, and how much more valuable still was the child of one of our great families. That was the principle on which the plan of campaign was to be conducted, but as soon as that began to be worked upon, we were faced with many objections.

In the first place, we found that while we would like very much to promote the reproduction of the fit, none of us know enough to determine accurately who were the fit and who would reproduce the highest type of the future individual. We don't know what the future man is going to be like. Mr. Bernard Shaw thinks he knows, but he is the only man who has even ventured to express an opinion in that regard. We don't know what to breed to. We have to keep the human animal plastic and open to response and above all things, avoiding all kinds of specialization or fixing of type. We are middle-of-the-road animals and have won our victory by being able to beat every other animal at its own game and in its own game

and in its own element, and only by keeping that up will we succeed in improving the future of the race.

In the second place, we found that all our comparisons with the lower animals were vitiated by a serious fallacy, that while we could produce certain changes in the lower animals at will, by selection, those changes were not for their benefit; they did not improve them from their point of view or enable them to compete better in the struggle for existence, but were made for our benefit; and the proper selection of the human breed will not stand comparison for a moment with the attempt at so-called improvement and development of high grade stock in other types of animals. The third thing we discovered was that the genius was a remarkably rare and fortunate accident and that the very fact of a genius having appeared in a family was pretty good evidence that there wouldn't be any more geniuses in that family for at least twenty or thirty generations; and finally we found that when the community had acted upon the principle of endowing the successful man with titles and official position, or landed estates in the hope that he would produce a class of people of greater value to the community, what really happened was that the brilliant and able man married a commonplace wife and produced commonplace children. So that we locked up, for the benefit of not more than 3 to 5 per cent. of the community, something like 30 or 40 per cent. of the resources of the right or primogeniture and by the unrestricted right of inheritance of private property, which is one of the things that will have to go down in the future. We had succeeded in starving and crushing out and killing at least five to ten geniuses in the great 70 per cent. of the people for every one we bred to order in the upper 5 per cent. of the community.

So the next line eugenics decided to take up, was the negative side, preventing the reproduction of the obviously and clearly unfit. Here we had the advantage of having a criterion about which there could be no two opinions. It was perfectly possible to establish a criterion of normality and everyone falling below it was to be regarded as an unfit and undesirable type to reproduce, and it was not very long before we began to make the exceedingly interesting and most encouraging discovery that the larger part of those qualities which rendered the individual unfit for competition were things handed down to him from his ancestors and which would be handed down by him to his descendants. I need not detain you with the statement of the actual results of these investigations. They are familiar to practically all of you. But it was found that about from 2 per cent. to 3 per cent. of the community were congenitally defective and from that 2 per cent. to 3 per cent. sprang the enormous mass of our feeble-minded, of our epileptics, a large share of our insane, a large share of our prostitutes, a majority of our criminals and the vast mass of our paupers and tramps;

that we had gathered together, as it were, in one stream and one line, a tremendous number of the undesirable and unfit element of society.

Plans were proposed at once for the limitation and the cutting short of the further perpetuation of this type of individual and this contamination of the race stream, this pollution of the blood of the community. The most careful investigations have shown that never, from a feeble-minded father and mother has been born a normal child—no instance has been brought forward where that miracle has occurred, and according to the percentage of defects, obvious or concealed, which exists in the parents, so will be the percentage of defects in the offspring. These conditions emphatically breed true and if we can manage to break this stream in one way or another, we shall succeed in stopping an immense number of these defectives and misfits of our human species. The method suggested for doing this is the simple one of extending the care of the schools so that intelligent experts in mental development, intelligent physician, and a born teacher, shall examine every child in the community, certainly as early as three years and preferably earlier, and watch for the development of the little peculiarities, showing these hereditary defects. When those defects are discovered, those children should be taken and placed in a special environment out in the country under the most favorable and happiest circumstances and trained and developed to the highest pitch they can possibly be, but prevented from reproducing their kind by permanent segregation. When this has once been done, it would only be a few decades before we should see a rapid falling off in the percentage of pauperism, crime, insanity, epilepsy and feeble-mindedness.

The question is now, are we producing this defectiveness, this feeble-mindedness, these hydra-headed forms of defectiveness, is it a breakdown under the strain and stress of civilization, or is it merely the persistence from an almost indefinite period in the past, or radically defective strains?

In other words, are we manufacturing our defectives or are we merely perpetuating the defectiveness which has been inherited from past generations? On that subject a great deal of admirable work has been done, resulting in the conclusion that we are not manufacturing defectives, that the strains of civilization are not producing mental defects which manifest themselves in the form of feeble-mindedness, epilepsy, insanity and crime, that these are not increasing under civilization, but that we are simply perpetuating, from some far period in the history of the race, a strain of mental and physical defects. It is merely an arrest of development, the lowest type of the feeble-minded is the individual whose development is arrested at about the age of the child of two; the next lowest is one whose mental development is arrested at about the age of a child of six, and the next lowest is one whose development is arrested at about the age of a child of nine, and so on, until, if we go very much further, we might begin to

make invidious personal comparisons which would not be altogether—well, you don't want to carry anything too far, as Doctor Sedgwick said. The situation appears to be that there are two great reservoirs of this mental defectiveness, one of them being, not the city slum, for that has a lower percentage of feeble-mindedness, epilepsy and insanity than the poorer and remoter class of open districts which are the real rearing places for our defectives and feeble-minded. The little colonies which dot our country all over from the fisher villages of Nova Scotia and the coves of the Allegheny Mountains, to the pine barrens of the Southern States and the swamping river-bottoms of the West. Probably everyone of you has known of some such community of chicken thieves and drunkards and paupers and feudists and smoke-house robbers who live off by themselves and interbreed, protected from elimination by the very low grade of their surroundings and the small amount of strain which is brought to bear upon them. They live like animals because they have an animal mentality and are placed under animal surroundings.

The other reservoir for that defective strain is the group of privileged doodlewits at the other end of the social scale, whose eccentricities have been carefully preserved and protected from the foolkiller on royal thrones and in millionaires' families, in Four Hundreds and upper Ten Thousands and groups of that kind, safe from the competition and pressure which would otherwise have wiped them out of existence. In the intermediate and lower ranks of life there are not so many of those defectives, but there are historical instances that recall themselves, of a magnificent succession of degenerates. Indeed if sterilization of defectives had been insisted upon in the past at least three royal houses in Europe would have been put out of business generations ago. I do not mean to say that there is naturally any greater proportion of defectiveness among them than among other elements of society, but they are maintained by their family and rank and kept in a position where that defective strain can spread and trickle downward; it is even considered an honor by the remainder of the community to have it mixed with their blood. The question to what extent two great sources of deterioration produce this defectiveness is, I think, worthy of a moment's attention. They are the two great curses of civilization, alcohol and syphilis. Is it true that we are filling our jails and asylums and homes for dependents, because of the use of alcohol and the prevalence of syphilis, or is the relation the reverse action? That is, that alcohol is a germ poison, picking out the weak individuals and detecting the weak spots in the community, instead of actually causing them? The general trend, I think, of investigation, tends in favor of the latter view. We can hardly imagine it to be otherwise when we remember the way our ancestors used to boast of the number of bottles of port they could carry. We would all have been dead long ago if mere alcohol had been sufficient to produce

defectiveness. I don't know whether any of you remember the standards that obtained when the first temperance society in New England less than a century ago was formed. Its pledge ran as follows: "We, the undersigned, believing in the evil effect of strong drink, do hereby pledge ourselves on our sacred honor that we will not get drunk more than four times a year, Muster Day, Fourth of July, Thanksgiving and Christmas." That was the beginning of the first temperance society, and a community, which could stand such potations and saturations as that, is not going to be seriously damaged by the drinking that is going on at the present date. I believe that those two conditions, instead of producing defectiveness, merely pick it out and we should regard the drunkard and the individual who goes insane from syphilis as emphatically not to be trusted to reproduce the race. That our laws as regards divorcing such individuals should be made practically self-acting instead of encouraging good women to marry men of this description in the hope of reforming them by their Christian principles and their good example; that, I think is distinctly immoral, I care not who has upheld such a position.

The last bearing of this question that I would like to call to your attention is as to the amount of this type of defectiveness. Of course, we can pile up perfectly enormous and appalling figures running up into the hundreds of thousands, of the different types of defectives—feeble-mindedness, criminality, insanity, prostitution, etc., but, taken altogether, they do not come to more than 4 per cent. or 5 per cent. of the total community, 95 per cent. of the community are born normal and sound and the vast majority of us, no matter what strains we should be subjected to, are hopelessly and monotonously sane, not even cranky enough to be interesting. The general average of the race is high and good, and the real field of eugenics, in my judgment, is the recognition of this fact, first of all. By all means, weed out, by appropriate and kindly segregation, those unfortunates who have been born accursed and prevent them from passing on that tainted plasm to the next generation, and we should soon see a marked improvement in affairs. The next thing is to alter our attitude to the great mass of the people—and that has been the most serious and dangerous result of this strain of defective plasm in the race. We have actually taken, in our inspired intelligence, that 2 per cent. or 3 per cent. of defectives as the creatures which all men would become if they were not held down by the strong hand of the law or upheld by the support of religion. We have pictured 2 per cent. or 3 per cent. of defectives as the basal type of the entire community and have allowed that to color our laws, our prison regulation and our methods of what we are pleased to term justice, until we have produced a code which, for savagery, stupidity and ineffectiveness to 97 per cent. of the community was never needed for a moment, except by the 3 per cent. of unfortunates at the lower end of the scale. We

should recognize that the tendency of 95 per cent. of humanity is upward and forward and that the vast majority of men would be law-abiding if there were no laws. That the place where our geniuses and our great men and desirable individuals are bred and born, is in that 75 per cent. to 85 per cent. of the race, which is the backbone and seed bed of every people, and that the main thing needed in eugenics is to preserve and conserve the virtues of the heredity of 90 per cent. of us. I believe that we shall come to feel more and more that the man who is to be chiefly regarded is the average man and not the exceptional man, neither the exceptionally and unnecessarily good nor the exceptionally bad. That the people to whom we should direct our attention and for whose welfare we should work, are, in Lincoln's phrase, "the great, plain people whom God Almighty must have loved, because he made so many of them."

THE NEED FOR GENERAL HEALTH-PROTECTIVE SURVEYS AND PROGRAMS.

M. N. Baker,

President, Board of Health, Montclair, N. J.; Editor, Engineering News, New York City.

Read before the American Public Health Association, Washington, D. C., September, 1912.

Efficient work in any field demands a well-conceived program. Before such a program can be prepared the field must be surveyed in order to ensure a program, the several parts of which shall be rightly proportioned to each other and to the whole, shall not overlap unduly, and shall have a proper sequence of time. This is notably true of work in the health-protective field, the area of which is so large, the boundaries of the whole and of its many parts so uncertain and the topography so varied.

What and how large is the health-protective field? It is as true of this field as was once said of another one, "the field is the world." For most of us, however, the field is limited to a single commonwealth, a city or, perchance, to a small town or even a village. But however small the field, a program is needed for continuous efficient work and before the program must come the survey.

Dropping, for present purposes, that conception of the health-protective field which would make necessary a world-wide survey and program let us firmly grasp the idea that one of the greatest needs of the day is a public health program which will definitely assign to the federal, the state and the local governments each their own parts and establish for each the metes and bounds within which it shall confine its labors. Such a delimitation of the health work of the nation, the state and the city is not easy, for the diseases with which we are contending are checked in their spread by no governmental boundary line.

Looking at the subject thus broadly it might be supposed that health-protective work should be essentially national in character, with the several states subordinate to it and the minor civil divisions subordinate to the states. But, in the United States, at least, we have no federal health department and even if we had, our federal government has no power within the several states except such as was conceded to it by the states in framing and adopting the Constitution. Among the powers given over by the states to the nation, control of health matters is not mentioned—not even by implication, except in the "general welfare" and interstate commerce clauses of the Constitution. This is not so much an omission due

to the fact that public-health work was unknown in 1789 as would seem at first thought, for it should be remembered that health regulation is founded on general police powers, which were sufficiently well developed when the Constitution was framed to leave no doubt that the several states had no more intention then than now to delegate their police powers to the general government.

It is true that the interstate commerce clause can be stretched to cover a multitude of sins against public health and that "general welfare" may be interpreted as broadly as the spirit of any given time may permit, but neither one of these alone nor both together are as yet accepted by either public opinion or the courts as warrant for federal control over state and local health-protective work. Moreover, it is interesting to note that such health-protective work for the control of specific outbreaks of disease as has been done by our federal government has generally if not always been in coöperation with local rather than state authorities. This fact is mentioned to illustrate how far we yet are from a public-health administration centered in and controlled by the federal government and reaching down through the state to the local governments.

The latter remarks on federal health activities have been made because throughout all the recent campaign for a federal bureau or department of health scarcely anyone seems to have given careful thought to the relationship which should be established between the federal, state and local health services.

Coming now to the states, most of these have at least a nominal board of health; many are doing a large amount of valuable health-protective work; a few are doing all that can be expected in the present state of public opinion and ignorance of health matters. Not a single state, so far as I know, has made a complete public-health survey of its whole area, worked out a program to meet present and prospective needs, and provided ways and means for carrying out the program.

While the sovereign states of the Union have ample power to bring local boards of health under the supervisory control of the state departments of health, or in most if not in all instances to substitute state for local control of health matters, there are but few states which have gone far in attempting to correlate the work of state and local boards. The state boards, instead of holding local boards up to a high standard, step in on appeal or of their own volition and perform duties which the local boards have neglected or have found beyond their capacity.

The country over, many cities and towns have a health board or department in name only and even where fairly well-manned and equipped local health departments exist, the work done from year to year covers only a part of the health field, and frequently spreads in haphazard fashion over other municipal provinces—such as the street or building departments.

Much of the health work which is done under such conditions has been taken up by chance, or at least has been prompted by the sanitary vagaries of past decades. Anything approaching a thorough sanitary survey, along modern lines, has never been more than dreamed of in a majority of the cities of the country, while the cities that have made such a survey and marked out a comprehensive program for five or even two years to come are few and far between.

What is needed first of all, is an authoritative determination of what's what in public health work. Next there should be settled how this work is to be divided between the federal, state and local governments, including the extent of coöperation between the federal government on the one hand and the state and local governments on the other; and also the extent to which the state boards of health shall have control over local boards and, in such matters as public milk supplies, even perform administrative work hitherto done chiefly or wholly by local boards.

Having determined what lines of work are proper functions of health departments, and having relegated to other departments the classes of work which functionally belong to them and are now clogging health boards, and having divided health work between the federal, state and local governments so as to prevent overlapping, conflict of jurisdiction and general inefficiency, the various health-protective agencies of the country should begin comprehensive surveys, each in its own province. Such surveys would disclose health-protective needs, indicate their relative importance, the measures, money and men necessary to meet them, and the order in which they should be met. The latter point deserves emphasis, since for many years to come health-protective demands will so far outrun available public funds as to make imperative a wise choice between what should be done this year and what may be postponed for one or more years.

Before I close I wish to call attention to the fact that some of our state departments of health call upon a city to install expensive sewage treatment works, for instance, when the interests of health would be far more promoted by improving the local water-supply or providing for the sanitary supervision of the milk-supply. Both state and local health authorities should have an intimate knowledge of all local sanitary needs before singling out one as an object of heavy outlay.

Finally, I venture to submit here, with slight modifications, suggestions made two years ago before the National Municipal League, as follows:

(1) That for the present public-health-protective work should be directed more particularly to the suppression of communicable diseases and the reduction of infant mortality, and that in their direct administrative phases these are functions of our local boards of health.

(2) That the chief functions of state boards of health should be to hold local boards to their health-protective duties along the lines just stated

and also to hold other branches of the municipal government, as well as private corporations and individuals, to a proper fulfilment of their various sanitary duties.

(3) That an additional and highly important function of state health boards is to perform certain lines of sanitary inspection which if left to local boards would result in overlapping work and in actual conflict, or else would be left undone, meaning particularly the control of the purity of public water-supplies and milk-supplies.

(4) That beyond these things, the several states should do a large amount of research and educational work, besides always coming to the aid of the municipalities in emergencies.

(5) That the federal government, aside from measures to prevent invasion by disease from foreign countries, should have much the same relation to the states of the Union as should the several states to the municipalities within their respective limits; or in other words should serve as a sanitary police in interstate matters, carry on research and educational work of national or at least large sectional interest, and come to the aid of states and cities in the case of emergenices.

These suggestions are submitted as a basis for what might be termed preliminary surveys of the health-protective field and of its several divisions. If followed, they would at least serve to point out what is being done and what is left undone; how the work of the different branches of government overlaps in certain areas and leaves other and perhaps wide territories uncovered; and how much is being attempted in the name of public health which really belongs to public cleansing, public comfort or public convenience and could be done more efficiently and economically by other departments of government.

A UNIQUE ORGANIZATION OF MILK DEALERS.

FREDERIC D. BELL,
Lederle Laboratories, New York.

Read before the American Public Health Association, Washington, D.C., September, 1912.

The City of New York has now attained a population of over 5,000,000 human beings. Daily there flows into the city something over 2,500,000 quarts of milk and cream. This supply comes from seven states and from distances as far away as the eastern part of the State of Ohio. Between 40,000 and 50,000 dairy farms contribute to this enormous body of milk and cream. Practically the entire supply is distributed by dealers who have no ownership or direct control over the dairy farms producing the milk.

It was realized by these milk dealers that to protect themselves as between the farmer or producer and the New York City authorities having control of the sanitary aspects of the milk supply it would be extremely desirable to have an organization—for "In union there is strength"—where they could discuss the sanitary problems involved and mutually help each other in their solution.

For a number of years these same dealers have been organized in an insurance society for the purpose of insuring their creameries and other buildings. They had also had an organization for the purpose of collecting and redistributing lost bottles and cans. The peculiar conditions existing in New York City, with its tenement and flat houses, made such an organization absolutely essential. It was not, however, until 1905 that any serious attempt had been made to organize for the purpose of working out together the sanitary problems involved in the care and distribution of milk. About that time an organization was completed, known as the Association for the Improvement of the Milk Supply of New York. Some fifty-five dealers in Greater New York joined this organization. They met monthly with greater or less regularity and discussed subjects that were pertinent to their business, particularly any new sanitary regulations which may have been promulgated by the local or state authorities. Eminent scientists were occasionally asked to address these meetings. Interest in this organization began to lag within three years after the organization, and finally it practically died a natural death.

Early in 1910 some of the larger dealers who had been interested in the defunct organization, finding that such coöperation was almost essential, got together and revived the association under the name of The New York

Sanitary Milk Dealers Association. In this organized body were to be found most of those who had been in the older organization, and some that had not. The total membership is now about forty. Certain defects in the original association were carefully avoided in the new. Each member was required to subscribe to the Constitution and By-Laws of the association, and particularly to three clauses, which it may be of interest to read at this point:

If elected a member, I agree to coöperate with the other members in seeking to accomplish the objects of the Association as outlined in Article II of the Constitution and to comply with Articles XI and XII of the Constitution.

ARTICLE II.

The objects of the Association shall be as follows:

First: The improvement of the milk supply:

(A) Through the coöperation of the members of the Association in adopting advanced scientific methods and machinery to be used in the handling or distribution of the product, so as to produce a more wholesome supply;

(B) Through the enactment and adoption of uniform and improved rules and regulations to be observed by the members, covering the sanitary and other allied conditions, so far as the members of the Association may be able to control or influence the same, of farms and dairies where milk is produced or of creameries and shipping stations, covering conditions and methods in the transportation of milk and allied products and the handling of the same;

(C) Through experiments and investigations and bacteriological analyses to be conducted by scientific experts to be employed by the Association, and the dissemination of the information so obtained among the members of the Association;

(D) By the exchange among the members of ideas and the results of experience.

Second: To improve the conditions under which the business of buying, selling and dealing in milk and its allied products shall be carried on through coöperation with the Department of Health and other state or local officials in forwarding appropriate legislation or sanitary regulations or sanitary ordinances and in opposing legislation or regulations inimical to the proper conduct of such business.

Third: To coöperate with other societies or bodies having similar objects in obtaining such desired results.

Nothing herein contained shall include any regulation regarding either the price for which milk or allied products shall be bought by the members nor the price at which the same may be sold, nor shall any regulations be adopted by the Association having such objects in view.

ARTICLE XI.

Members agree as a condition of membership to comply with the state and municipal laws and regulations and to observe all sanitary measures promulgated by controlling authorities.

ARTICLE XII.

Section 1. Members agree to give access to authorized representatives of the Association, delegated by its Board of Trustees or an Executive Committee of such Board, to make inspections of their plants and equipments, or conduct investigations as to their methods of carrying on their business, including the taking of samples for analysis to determine whether or not members are complying with the obligations assumed, as outlined in Article XI.

Sect. 2. The work of inspection and investigation shall be delegated to the Consultants and Analysts of the Association, who shall make a report in writing of their findings in the Executive Committee.

To properly carry on the business of the Association as outlined in the above Articles, there is elected a board of Trustees of fifteen members, and from this Board an Executive Committee of six is appointed. In addition to the Executive Committee there are five other committees. These are: the Membership Committee, the Finance Committee, the Auditing Committee, the Sanitary Committee, and the Law Committee. Briefly, the duties of these committees are as follows:

The Membership Committee passes on applications for membership and, where thought desirable, make plans to increase the membership.

The Finance Committee considers plans for the raising of funds, which is done on an assessment basis, an annual charge being made on each wholesale and retail wagon operated by the members of the Association. It was in this way that the larger dealers who were better able were required to pay a larger share of the expenses of the organization.

The Auditing Committee audits the bills and accounts of the Treasurer.

The Sanitary Committee considers the sanitary problems surrounding the production of milk at the dairy farms, the transportation to the creameries, the handling at these points, the reshipment to the city, the pasteurizing and bottling, the washing of utensils and containers, the storage and delivery and all other problems of a sanitary nature.

The Law Committee considers and reports upon such sanitary ordinances as may be adopted by the local authorities or such laws as may be proposed or passed by the state legislature. It also considers such legislation as may be desired by the membership for the purpose of improving the conditions surrounding the business.

Meetings of the Association are held monthly, and sometimes more frequently, if circumstances demand.

So far as the writer knows, this is the first organization of milk dealers attempting to improve the sanitary conditions surrounding the milk business. In order that it may be clear that such an endeavor is actually being made, it may be of interest to know, very briefly, some of the things which the organization has done since its reincarnation in 1910.

Perhaps the most interesting and spectacular thing which the organization has done has been the issuance of its educational leaflets.* So far, three of these have been issued. The first, known as "The Care of Milk in the Home," was prepared for the purpose of instructing the consumers as to their duties in the matter of the handling and care of milk. It is rather an interesting coincidence to note that while this circular was being prepared, a similar circular was being written by the Department of Agriculture in Washington and by the department presided over by the food commissioner of the State of Illinois. Later we learned of a similar leaflet, although not quite so comprehensive or specific, which had been pre-

* Copies of these will gladly be sent to any interested reader.

pared by a Doctor E. C. Levy, the health officer of Richmond, Virginia. The publication of this leaflet was commended very generally the country over and it was reprinted in several State Health Department *Bulletins* and other periodicals. Women's organizations at various times demanded large numbers for distribution among their members, and the Association felt very well repaid for the effort and expense involved. It is naturally very difficult to estimate the exact effect that such a publication may have upon the consumers in so large a city as New York. The effort, however, was so encouraging that somewhat later the Association published the second of the series, known as "The Care of Milk in the Store." Conditions surrounding the sale and distribution of milk from grocery stores, delicatessen shops and the like in the City of New York were far from being satisfactory, either to the health authorities or to the dealers themselves. It was hoped that the publication and distribution of this circular would help to explain the wise regulations which the Health Department had made and which it had been unable very largely to enforce. The Association believes that the distribution of this circular supplemented to a large and profitable extent the excellent work of the local authorities and other organizations aiming to bring about the same good ends. This circular also received favorable comment and has had a wide circulation.

The third of the series has only just been published. It aims to give some simple directions to the farmer regarding the sanitary condition surrounding the production of milk and to explain the requirements which have been made by the New York City Board of Health and by the state authorities, and which have been so irksome to such a large number of producers. None of these circulars are aimed to be exhaustive memoranda on their respective subjects. Least of all is this the case, perhaps, with this third circular. Nevertheless, the Association believes that there is sufficient information conveyed so that if the instructions are followed, a very material help to the progress of the cause of clean milk will have been given.

A brief résumé of the subjects discussed at the monthly meetings may be of interest. One of the first of these subjects to command the attention of the Association was the proposed ordinance for hermetically sealing milk bottles containing pasteurized milk. A great deal of time and money was spent in the investigation of so-called devices for effecting a perfect seal, and finally the regulation was withdrawn by the local board of health.

A bill for the regulation of the capacity of milk bottles and cans was very carefully considered by the Association, and certain modifications of the bill were suggested through the Law Committee of the Association to those having it in charge in the state legislature.

The requirements for the pasteurization of milk were very thoroughly discussed on several occasions. Conferences were held with the local

health commissioner on this subject and certain modifications making the regulations practical were obtained.

The question of the transportation of the milk under proper refrigeration conditions was vigorously taken up by the Association with the milk agents of the various railroads transporting milk to this city. A decided improvement in the manner in wich the cars are iced and in the temperatures of the milk on receipt in New York City was obtained as a result of this campaign.

The question of the possible prohibition of the sale of so-called "loose milk" to be dipped from cans in grocery and other stores was being seriously considered by the local board of health. Several meetings to discuss this problem were held by the Association. Finally a resolution, of which the following is a copy, was adopted:

Resolved, That it is the sense of this meeting of the New York Sanitary Milk Dealers Association that the rescinding of all permits for the sale of loose or dipped milk from grocery or delicatessen stores would in our judgment be a great mistake; and be it *further resolved* that we approve of such action on the part of the Department of Health looking to the sanitary regulation of such stores as will make them proper places for the sale of loose or dipped milk, and that we approve of the cancellation of permits to such stores as do not satisfactorily comply with the proper sanitary regulations of the Department of Health.

The question as to whether or not milk bottles and cans should be cleaned before they were returned to the country creameries was discussed with great fervor at several of the meetings. The New York City Sanitary Code requires that—

It shall be the duty of all persons having in their possession bottles, cans or other receptacles containing milk or cream which are used in the transportation and delivery of milk or cream to clean or cause them to be cleaned immediately upon emptying. No person shall use or cause or allow to be used any receptacle used in the transportation and delivery of milk or cream for any purpose whatsoever other than the holding of milk or cream; nor shall any person receive or have in his possession any such receptacle which has not been washed after holding milk or cream or which is unclean in any way.

This section of the Sanitary Code, it is believed by the milk dealers, is unjust. Not that they are unwilling to clean their milk bottles and cans, but they believe that the ordinance should be enforced on the consumer and not on the dealer. As it now stands, if a dealer takes up a dirty can or a dirty bottle which the consumer has failed to clean, he is liable to arrest. This matter was very carefully considered and a long memorandum prepared and sent to the Department of Health indicating the attitude of the dealers toward this matter. Legislation on this subject proposed at Albany was carefully discussed and a committee of the Association appointed to appear at the hearings and present the views of the New York dealers.

At one of the regular monthly meetings there was a demonstration of the

proper use of the Babcock machine for the determination of the butterfat content of milk and cream. At this meeting the dealers had present their creamery foremen, who operate these machines at the creameries,. The various pitfalls into which the inexperienced man is likely to drop were carefully pointed out, and the dealers were urged to have these tests made regularly for their own self-protection.

At another meeting the commissioner of agriculture of the State Department of Agriculture appeared and discussed the state laws with reference to milk and its products.

On still another occasion certain suggestions were discussed for the improving of conditions surrounding the production of milk at the dairy farms. It was decided to impress upon the farmers the desirability of using a small-mouth milk pail. Other practical suggestions of this kind were considered and the dealers urged to promulgate the suggestions amongst their dairy patrons.

At one of the meetings consideration was given to the question of the growth of bacteria in milk at different temperatures and under different conditions. It was interesting to observe how keenly the dealers listened to this discussion and how much they had learned of the bacteriology of milk since the organization of the Association, and how intelligently they were able to discuss the questions presented.

It was very early discovered after the organization of the Association that the milk dealers could be interested in these sanitary problems, if for no other reason, from a selfish motive. Hundreds of thousands of cans of milk formerly shipped to this city were lost because of souring, due to the improper care of the milk either at the farm, the creamery, or in transit. This meant thousand of dollars of loss to the dealers, and when the reasons for this loss were clearly understood, the dealers were only too willing to take such steps as they could to improve the conditions and prevent this drain on their profits; not that they were unwilling to take these steps because of their interest in improving the supply outside of the selfish interest of the stoppage of waste. Practically all of the dealers were anxious to obtain and to serve a high grade of safe milk, especially where it was to be used for infant feeding.

In New York City the conditions surrounding the milk business, starting back at the dairy farms and following the supply to its final consumption, are today fully 100 per cent. better than they were ten years ago. We believe that the work of this Association is responsible to a very considerable extent in this improvement. It is confidently expected that this good work will be continued and that the efforts of the Association and its individual members in the future will bear even greater fruit than has been the case in the past. There is no question but what the influence of the dealer with the farmer who supplies him with his milk is greater than

the more or less arbitrary authority of the city inspectors who in very many instances are none too well posted with regard to their duties and who, to say the least, are not always diplomatic. There has been roused in the past a very strong and stubborn resistance on the part of the farmers to the Health Department regulations. When these regulations have been explained in a diplomatic way by the dealers or their representatives there has practically always developed a willingness on the part of the dairy farmer to do anything reasonable within his power to improve his conditions.

The institution of similar organizations in the larger cities of the country would be a very powerful influence for the bringing about of the more or less ideal conditions under which milk should be produced and sold.

SANITARY IMPROVEMENT IN CUBA AS DEMONSTRATED BY STATISTICAL DATA.

JORGE LE-ROY Y. CASSÁ, M. D.
Habana, Cuba.

The health of the people being the supreme law everything that contributes to it serves both science and humanity. There is no more positive lesson, therefore, of so beneficial results than that which shows, in an evident manner, the benefits obtained in the preservation of life and the prevention of diseases.

As these meetings should be of a practical nature, I have decided to present before you, in numerical form, the results achieved by our sanitary campaign. The fight against preventable diseases, diminishing the death rate for the whole country, and wiping away from the obituary tables several diseases, such as smallpox and yellow fever, which decimated until recently our population; the colossal victory just gained against bubonic plague, surprising the latter before it could invade us in an alarming form, speaks very highly for our sanitary organization. These figures also serve to demonstrate that the old notions about the unhealthiness of tropical climates, though refuted many years ago by our great Doctor Finlay, were erroneous and founded on a false traditional belief, as proved by the facts when the hygienic measures advised by our scientific men were energetically applied.

Likewise those same figures serve us in making evident other evils which we should avoid, endeavoring with all our resources to eliminate the causes which originated then and to make known to all, that in order to do sanitation everything that opposes the compliance of hygienic precepts should be done away with.

In regards to the mortality for the whole country I can not present figures prior to 1900, because the documents consulted by me previous to that year do not include all the island, having reference only to isolated localities and hence the true sanitary condition of the country cannot be ascertained. However, with the data for the last twelve years, it can be shown that there has been a marked decrease in the death rate:

The increase in the total number of deaths in the years 1906 and 1907 is due in great part to grippe, which began in 1906 and reached in the next year to 414, the highest figure recorded during the period of our investigation; infantile enteritis also in that year recorded the largest number of victims (5,952).

During that year of 1907, the American Intervening Government issued two decrees, Number 894 dated August 26, and Number 1187 dated November 22, by which all the sanitary services of the Republic of Cuba were nationalized and our land and marine sanitary organizations were united, the beneficial results of those measures were rapidly manifested by the remarkable decrease in the death coefficients in succeeding years, with the exception of that of 1910 which rose again to 15.21 per thousand. That rise was explained by me in the *Letter of Transmittal* to the Director of Sanitation in the following manner:

"The coefficient of mortality is represented by 15.21, and is somewhat higher than that of 1909 which was only 13.03. An investigation of the

Years.	Estimated Population.	Total Num. of Deaths.	Death Rate.
1900	1.632,320	28.779	17.35
1901	1.691,834	27.754	16.34
1902	1.751,366	25.512	14.53
1903	1.810,889	23.982	13.20
1904	1.870,411	25.198	13.42
1905	1.929,934	27.345	14.16
1906	1.989,457	30.021	15.04
1907	2.048,980 (Census)	34.000	16.58
1908	2.141,322	28.361	13.17
1909	2.213,299	28.832	13.03
1910	2.220,278	33.844	15.21
1911	2.297,134	32.065	13.96

causes leading to this increase of 2.18 over the coefficient of the previous year led us, in the first place, to trace it to the increase of population, and above all to that of natality. As we all know, in countries where there is a high rate of natality there is a large mortality, for children furnish the greater number of deaths. In the second place, we ascribe the increase to the death-dealing influence of grippe, which continues to cause a disastrous havoc upon persons of weak constitution. For instance, if we examine the influence of grippe over those diseases upon which it is most directly manifested, by summing up the mortality brought about by grippe, tuberculosis, organic diseases of the heart and of the vessels, bronchitis, broncho-pneumonia, pulmonary congestion and pleurisy, we observe that there has been an increase of 2.165 deaths from this cause over those year before last; a figure which is equal to more than one third of the total number of deaths (37.95 per cent.). On the other hand, deaths produced by infantile diarrhœas, numbered 6.139 or an increase of 1.921 over those of the previous year and equal to one sixth (18.44 per cent.) of the total.

Adding these two causes of disease, we find that they represent more than one half (56.09 per cent.) of the total of the mortality occurring in the Republic for the year."[1]

SMALLPOX. The disappearance of smallpox since July 1900, is one of the greatest victories achieved by the Sanitary Department, both during the first American government of intervention as well as during our own government; since that date, the only case registered, was that of an employee of Las Animas Hospital, who became infected some time in June, 1901, from a serious case of one of the immigrants from St. Nazaire (France). The employee had been recently appointed and had managed to elude the vaccination which is required of all employees at that institution whenever a case of smallpox is admitted to the hospital, and death was the penalty for the transgression. The revaccination of all the staff, the isolation and disinfection succeeded in avoiding an outbreak and also served to show the efficacy of these measures.

In order that the importance of this victory may be easily appreciated, I reproduce herewith the table of deaths from smallpox which have occurred in Habana since the year 1870.

DEATHS FROM SMALLPOX IN HABANA.

Years.	Total Number of Deaths.	Years.	Total Number of Deaths.
1870	681	1891	151
1871	1126	1892	0
1872	174	1893	8
1873	47	1894	216
1874	772	1895	181
1875	711	1896	1004
1876	160	1897	1404
1877	97	1898	168
1878	1225	1899	4
1879	523	1900	2
1880	446	1901	0
1881	706	1902	0
1882	1	1903	0
1883	5	1904	1
1884	1	1905	0
1885	0	1906	0
1886	0	1907	0
1887	1654	1908	0
1888	550	1909	0
1889	7	1910	0
1890	12	1911	0

[1] *Sanidad y Beneficencia*, Habana, 1911, t. VI.

From the study of the above figures it may be learned that this disease, which almost never disappeared from our obituary tables, reached proportions truly alarming in the epidemics of 1870–72 (1981 deaths), 1874–76 (1643 deaths), 1878–81 (3,000 deaths), 1887–88 (2,104 deaths) and in 1896–98 (2,576 deaths) which was the last one we had in Cuba.

Yellow Fever. While the smallpox infection was terrible in its effects, yet it could be avoided by the simple process of Jenner's vaccine; on the other hand, yellow fever attacked all who lived upon our soil, playing havoc among the foreigners, who were not always willing to risk their lives and therefore contributed in great part to our scanty immigration. Since 1761 yellow fever became permanent with us, being imported by the convicts from Vera Cruz (Mexico) when at the request of Governor Prado they were brought to Cuba, to work in building the defenses of Habana, foreseeing the war with England, which culminated in 1762 with the fall of the city to the English. Before that time, however, in 1741, yellow fever was imported by the English fleet under Vernon, which arrived at Guantanamo, in the southern coast of Cuba. In 1649 there existed the disease, becoming epidemic until 1655 and probably also in 1620, when it was called the Habana Epidemic and which spread later to the French West Indies.

From 1761 to 1901, it can be asserted that every year there were victims of the disease as proved by the documents gathered by the American Yellow Fever Commission presided over by the late Dr. S. E. Chaille in 1879.

In the table on page 259, which includes a period of over half a century, the truth of the above assertion can be clearly noticed:

From September 28, 1901, until the same month in 1905 we had defended ourselves against this disease, in spite of continuous importation of cases from different seaports on the Gulf of Mexico; but in the year 1905 a serious epidemic of yellow fever made its appearance in Louisiana and West Florida and from there it was introduced again into Cuba causing, until December 24, 1908, 359 cases of which 127 died. This last importation of yellow fever into our country, besides the positive lessons pointed out by Doctor Guiteras in his *Notes on yellow fever and tuberculosis in Cuba during the last years*, serves also to prove that with reference to hygiene and sanitary vigilance the ties which bind the measures recommended by science in their practical application, should never be relaxed.

Malaria. Another of the infections which contributed to raise the deathrate coefficient of our statistics was malaria, a disease against which our sanitary organization has won a great victory. If the figures representing the number of deaths caused by malaria were examined, we will find that in 1900 there were 4,107 deaths and it has gradually decreased to 526 in 1911, representing a reduction of 12 per cent. between the two years under comparison; the figures are still more flattering if the remarkable

increase of population is reckoned with, also the important works carried on by railway and sugar companies, in the country exposing the laborers to anopheles infection.

DEATHS FROM YELLOW-FEVER IN HABANA SINCE 1856.

Years.	Number of Deaths.	Years.	Number of Deaths.
1856	1309	1884	511
1857	2058	1885	165
1858	1396	1886	167
1859	1193	1887	532
1860	439	1888	468
1861	1020	1889	303
1862	1386	1890	308
1863	550	1891	356
1864	555	1892	357
1865	238	1893	496
1866	51	1894	382
1867	591	1895	5553
1868	290	1896	1282
1869	1000	1897	858
1870	572	1898	136
1871	991	1899	103
1872	515	1900	310
1873	1244	1901	18
1874	1425	1902	0
1875	1001	1903	0
1876	1619	1904	0
1877	1374	1905	22
1878	1559	1906	12
1879	1444	1907	5
1880	645	1908	1
1881	485	1909	0
1882	729	1910	0
1883	849	1911	0

In the following tables, I give the absolute and relative number of deaths caused by malaria in Habana since 1871 and in the Republic during the last twelve years. They speak for themselves, better than all comments that could be made.

I could continue the analysis in the course of every one of the diseases mentioned in Tables I and II, but not only would it be a useless repetition, but also extend this paper considerably. However, the decrease noticed in nearly all the avoidable diseases should be mentioned, particularly dysentery, typhoid fever, tetanus and even tuberculosis.

DEATHS FROM MALARIA.

	HABANA.					REPUBLIC.		
Years.	Total of Deaths.	Death Rate.	Years.	Total of Deaths.	Death Rate.	Years.	Total of Deaths.	Death Rate.
1871	262	1.33	1891	292	1.37			
1872	316	1.60	1892	286	1.33			
1873	329	1.61	1893	246	1.12			
1874	288	1.45	1894	201	0.90			
1875	284	1.43	1895	206	0.90			
1876	334	1.68	1896	450	1.95			
1877	422	2.12	1897	811	3.48			
1878	453	2.28	1898	1907	8.00			
1879	343	1.72	1899	909	3.76			
1880	384	1.93	1900	325	1.30	1900	4,107	2.51
1881	251	1.26	1901	151	0.55	1901	3,286	1.94
1882	223	1.12	1902	77	0.29	1902	1,546	0.87
1883	183	0.91	1903	51	0.19	1903	1,204	0.66
1884	196	0.98	1904	44	0.16	1904	1,079	0.57
1885	101	0.50	1905	32	0.11	1905	1,100	0.56
1886	135	0.67	1906	26	0.08	1906	1,147	0.57
1887	269	1.34	1907	23	0.08	1907	925	0.45
1888	208	0.99	1908	19	0.06	1908	730	0.34
1889	228	1.11	1909	6	0.01	1909	745	0.33
1890	256	1.23	1910	15	0.05	1910	622	0.28
			1911	12	0.03	1911	526	0.22

Attention should be called to the small epidemic outbreaks of scarlet fever, measles, whooping cough, diphtheria and grippe which invaded certain localities and thus increased temporarily the number of deaths from each of those diseases.

As to infantile enteritis, the factors which contribute to it are so complex and the causes are so multiple, that for the present I shall abstain from making any comments that the figures suggest. The only thing that should be considered is that our sanitary authorities have already taken measures as to the milk supplies for our infants, that dispensaries and other institutions have begun the maternal education in order to overcome popular errors and ignorance in regard to infant feeding.

All the above statements are truly flattering, yet it is at least alarming, the continuous progress revealed by the cancer death rate. The ascending curve which expresses the increase of that disease, the deaths of which have more than doubled, compel us to insist before all that those who devote themselves to the study of this disease, investigate the causes in order to combat the effects.

TABLE NUMBER I.

Total deaths and death rate per 1,000 of population. Republic of Cuba.

	1900.		1901.		1902.		1903.		1904.		1905.		1906.		1907.		1908.		1909.		1910.		1911.	
	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.
Typhoid fever	563	0.34	511	0.30	362	0.20	342	0.18	296	0.15	310	0.16	264	0.13	348	0.16	314	0.14	253	0.11	277	0.12	365	0.15
Measles	?		?		3	0.001	0	0.00	32	0.01	184	0.09	172	0.08	115	0.05	62	0.02	113	0.05	83	0.03	99	0.04
Scarlet fever	?		?		15	0.008	126	0.06	99	0.04	63	0.03	61	0.03	30	0.01	48	0.02	21	0.009	19	0.008	21	0.009
Whooping cough	?		?		12	0.006	90	0.04	101	0.05	92	0.04	159	0.07	135	0.06	212	0.09	147	0.06	201	0.09	116	0.05
Diphtheria and croup	84	0.05	97	0.05	103	0.05	113	0.06	136	0.07	137	0.07	199	0.10	194	0.09	195	0.09	214	0.09	161	0.07	167	0.07
Influenza	?		?		163	0.09	109	0.06	158	0.08	231	0.11	176	0.08	414	0.20	232	0.10	311	0.14	545	0.24	399	0.17
Dysentery	242	0.14	189	0.11	152	0.08	85	0.04	51	0.02	64	0.03	72	0.03	79	0.03	33	0.01	35	0.01	43	0.01	55	0.02
Leprosy	?		?		18	0.01	31	0.01	15	0.008	29	0.01	39	0.01	47	0.02	30	0.01	25	0.01	35	0.01	53	0.02
Erysipelas	?		?		35	0.01	35	0.01	27	0.01	38	0.01	37	0.01	38	0.01	47	0.02	45	0.02	34	0.01	38	0.02
Glanders	14	0.08	17	0.01	9	0.005	2	0.001	1	0.0005	1	0.0005	2	0.001	1	0.0004	1	0.0004	6	0.002	0	0.00	0	0.00
Anthrax	?		?		21	0.01	23	0.01	11	0.005	16	0.008	12	0.006	11	0.005	16	0.007	15	0.006	10	0.004	13	0.005
Rabies	?		?		0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.0004	7	0.0004	5	0.0003	9	0.0002
Tetanus	1,672	1.02	1,661	0.98	1,602	0.91	1,344	0.74	1,269	0.67	1,349	0.69	1,192	0.59	1,012	0.49	982	0.46	896	0.40	742	0.33	764	0.33
Tuberculosis	4,068	2.48	4,048	2.29	4,020	2.28	3,880	2.14	3,958	2.11	4,101	2.12	4,092	2.05	4,189	2.04	3,538	1.66	3,246	1.47	3,287	1.48	3,419	1.49
Cancer	428	0.26	503	0.29	539	0.30	601	0.33	661	0.35	746	0.38	808	0.40	813	0.39	901	0.42	981	0.44	1,004	0.45	977	0.42
Simple meningitis	1,088	0.65	1,344	0.79	1,228	0.69	1,165	0.64	1,262	0.67	968	0.50	931	0.46	1,197	0.58	773	0.36	989	0.44	1,033	0.46	797	0.34
Diarrhœa and enteritis (under 2 years)	3,177	1.95	3,801	2.25	2,264	1.29	1,920	1.06	2,373	1.27	3,279	1.69	3,659	1.84	5,952	2.90	4,224	1.97	4,218	1.90	6,139	2.77	5,724	2.49
Puerperal septichæmia	194	0.12	176	0.10	157	0.09	144	0.08	120	0.06	138	0.07	189	0.09	144	0.07	118	0.06	172	0.08	145	0.07	164	0.07

TABLE NUMBER II.

Total deaths and death rate per 1,000 of population. Municipal District of Habana.

	1900.		1901.		1902.		1903.		1904.		1905.		1906.		1907.		1908.		1909.		1910.		1911.	
	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent.	Total.	Per cent	Total.	Per cent
Typhoid fever	90	0.36	83	0.32	87	0.33	85	0.31	73	0.26	88	0.30	54	0.19	100	0.33	66	0.21	52	0.16	65	0.21	105	0.31
Measles	4	0.02	4	0.01	4	0.01	9	0.03	25	0.08	73	0.25	16	0.05	33	0.10	13	0.04	51	0.16	6	0.02	21	0.06
Scarlet fever	3	0.01	4	0.01	11	0.04	117	0.42	49	0.17	13	0.04	2	0.003	4	0.01	8	0.03	4	0.01	4	0.01	6	0.02
Whooping cough	?		4	0.01	3	0.01	10	0.04	6	0.02	2	0.007	5	0.01	28	0.09	14	0.04	3	0.009	7	0.02	21	0.06
Diphtheria and croup	15	0.06	25	0.09	25	0.09	26	0.09	21	0.07	28	0.13	37	0.12	56	0.19	27	0.09	30	0.09	29	0.10	21	0.06
Influenza	64	0.26	24	0.09	53	0.20	26	0.09	32	0.11	67	0.23	53	0.17	101	0.33	69	0.22	89	0.28	123	0.40	79	0.24
Dysentery	20	0.08	11	0.04	3	0.01	7	0.02	4	0.01	1	0.003	1	0.003	3	0.01	0	0.00	0	0.00	2	0.007	2	0.006
Leprosy	?		7	0.03	12	0.04	13	0.05	9	0.03	16	0.06	25	0.08	31	0.10	14	0.04	10	0.03	13	0.04	31	0.09
Erysipelas	12	0.05	4	0.01	13	0.04	6	0.02	6	0.02	6	0.02	8	0.03	5	0.02	6	0.02	3	0.009	6	0.02	3	0.009
Glanders	10	0.04	11	0.04	5	0.02	2	0.007	1	0.003	1	0.003	0	0.00	1	0.003	0	0.00	2	0.006	0	0.00	0	0.00
Rabies	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.003	6	0.02	0	0.00	3	0.009
Tetanus	185	0.74	148	0.58	97	0.37	54	0.20	52	0.19	43	0.15	45	0.15	46	0.15	43	0.14	33	0.10	22	0.07	29	0.08
Tuberculosis	856	3.43	811	3.15	959	3.62	1,037	3.80	1,161	4.15	11,79	4.17	1,158	3.93	1,176	3.89	1,185	3.80	993	3.11	1,046	3.40	1,115	3.33
Cancer	140	0.56	171	0.66	176	0.66	213	0.78	210	0.75	232	0.77	258	0.90	269	0.89	318	1.02	344	1.08	338	1.10	340	1.01
Simple meningitis	395	1.58	273	1.06	162	0.61	389	1.43	393	1.40	288	1.00	286	0.97	352	1.16	177	0.57	313	0.98	286	0.94	242	0.72
Diarrhœa and enteritis (under 2 years)	212	0.85	742	2.89	469	1.77	250	0.92	399	1.43	468	1.63	451	1.53	610	2.01	556	1.78	577	1.81	724	2.38	723	2.13
Puerperal septichæmia	15	0.06	13	0.05	23	0.09	21	0.07	25	0.08	17	0.05	16	0.105	14	0.05	14	0.04	20	0.06	13	0.04	22	0.07

ANNUAL REPORT ON THE CONDITION OF YELLOW FEVER THROUGHOUT THE MEXICAN REPUBLIC.

DR. EDUARDO LICEAGA,
Mexico City, Mexico.

Read before the American Public Health Association, Washington, D. C., September, 1912.

In the report which I had the honor to present to this Association at the meeting held in Havana, the reports on yellow fever reached up to the 25th of November, 1911, from which date I have to bring up my report on what has passed in the Republic to the last day of August of the present year.

The measures adopted to suppress the new focii were as follows:

When the yellow fever broke out in Mérida it was found that the focus was limited to the barracks which were occupied by the 16th and 31st Battalions and the "Rosado Peraza." A domiciliary visit was made to the persons lodged in those barracks, as well as to all who frequented them, taking their temperature twice every day, in order to discover any individual who might be suffering from fever and immediately isolate him in the Lazarrette. In this building all the necessary repairs were executed to adapt it to its purpose, and the Board of Diagnosis was commissioned to investigate every case. All the premises in which sick persons or others suspected of yellow fever lived, were duly disinfected and the struggle was actively continued against the larvæ of the mosquitoes, visiting the water cisterns throughout the town, emptying those which were found uncovered and spreading oil over those which could not be covered; besides which a very active supervision was maintained over all non-immunes outside of the focii above mentioned.

Since the 23d of November, sixteen cases of yellow fever were observed in Mérida, with six deaths; two in Motul with one death, one fatal case in Tamax, one in Espita which recovered, one in Maxcanu without a death, seven (?) in Kambul with seven deaths, giving a total in the State of Yucatán of fifty-three cases, the last one of which was observed on the 1st of May of the present year. Of all these cases, reports were constantly made to the sanitary authorities of the United States and Cuba. As you will see, the epidemic in the State of Yucatán has terminated.

On the 25th of May last, the sanitary delegate in Coatzacoalcos reported a case which was suspected of being yellow fever, and which was confirmed. It was found that the patient had gone from San Juan Bautista in Tabasco to the Port of Frontera. The necessary investigations were

made and it was then discovered that there had been five cases in San Juan Bautista, which the local sanitary authorities had not reported.

As soon as this was known, those authorities were pressed to display the greatest possible activity in the campaign against yellow fever, and offers made to impart the assistance of the federal government. This was at first courteously refused, but was eventually accepted in view of the spread of the epidemic, and then a Federal Sanitary Brigade was sent and commenced a systematic struggle against the disease. The cases at first succeeded each other with some frequency, but gradually disappeared with the result that during the epidemic there were fifty cases with twenty-two deaths, from the 1st of May to the 19th of August of this year. The last case observed was on the 19th of August, and up to the date on which this report was closed, we can consider as extinguished the focus of yellow fever which had appeared in San Juan Bautista.

A battalion which was in garrison in San Juan Bautista, proceeded to Frontera on board the S. S. *Walkyrian*, and on reaching that port was isolated. Two cases of yellow fever were observed amongst the crew of that steamer, one of whom was the chief officer and the other a sailor, the former with a fatal termination. The men were properly isolated and the entire crew were taken ashore to a place where they could be kept under observation, after which the steamer was fumigated and domiciliary visits were made both to the members of the crew as well as of the 39th Battalion. No fresh case appeared either in the city, in the battalion or in the crew up to the date on which I close this report. The diagram which I present shows at first sight the progress of the epidemic in Mérida and surrounding towns, as well as in San Juan Bautista, and the isolated cases which have appeared in Frontera and the sole case imported from Frontera to Coatzacoalcos.

But what I desire to show is, that if the circumstances now prevailing in the Mexican Republic have permitted the development of the two foci of which I have made mention, it is to be expected that, with the new plan of campaign which we are putting in practice, we will be able to finally extinguish this disease.

Mexico, 29th August, 1912.

AN ESTIMATION OF THE DAILY SOOT DEPOSIT IN INDIANAPOLIS.

H. E. Barnard and William D. McAbee.
State Board of Health of Indiana.

Of the many arguments favoring the abatement of the smoke nuisance, the most effective is, that showing the economical waste due to the non-utilization of a considerable quantity of the fuel shoveled into the grate. To the sanitarian there are other more weighty arguments. The continual inhalation of air befouled with ash and carbon cannot but produce definite results upon the respiratory organs that are certainly not beneficial and in all probability favorable to pathological change. This injury cannot be definitely established in terms of dollars and cents.

The soot and dust nuisance is directly and indirectly expensive because of the damage done to various materials. Soot deposits make house painting and finishing necessary far more frequently than if the air were clean; the cleansing of draperies becomes necessary at frequent intervals, and all laundry bills are increased greatly because of the condition of the atmosphere of the average manufacturing city.

Indianapolis is not different from other cities in this respect. Because of the fact that large quantities of soft coal are consumed and the city ordinances regulating the smoke nuisance are not effectively enforced, it is perhaps less clean than even larger cities where hard coal containing less volatile matter is used, or where fuel combustion is more carefully regulated.

In order to determine if possible the amount of soot deposited daily under ordinary working conditions, advantage was taken of a snowfall in the month of March to collect samples of snow which were later analyzed for their organic and mineral content. The snowfall which began at 10 p. m. March 2 and continued until 12 m. March 3 was followed by very cloudy weather. The record of the U. S. Weather Bureau shows the average velocity of the wind to have been about nine miles an hour and the prevailing direction northeast. The samples of snow were taken on Monday, March 4, between the hours of 12 m. and 3 p. m. The analytical results obtained show the deposit from the atmosphere during a period of twenty-four hours. Unfortunately, a large part of this time included Sunday afternoon and night when manufacturing operations were suspended and at a time while railroad traffic was much less than during a week day. For this reason the results obtained do not show conditions as bad as those of the average twenty-four hours.

The samples were taken at each street intersection within a radius of one-half mile from the center of the city and included that area known as

the "mile square." Samples were also taken in residential parts of the city, at the city hospital, near Fall Creek and in Irvington. Each sample included a square foot of surface. The snow from this measured area was carefully scraped together and placed in a numbered bottle. The snow, with its burden of soot and ash was melted and the insoluble content determined by filtering through a tarred Gooch crucible. The results obtained are shown graphically on the accompanying chart. The black dots represent one pound of organic and mineral matter per acre per day. The average deposition during the twenty-four hours under examination was 10.28 pounds per day in the district included in the "mile square." Presuming a similar deposition during the three hundred and sixty-five days in a year, the total amount of coal and ash deposited on that territory is 1,200.7 tons per annum. As a matter of fact, the deposition is no doubt greater than this, for as before indicated the observation includes only a part of a day in which business operations were in motion.

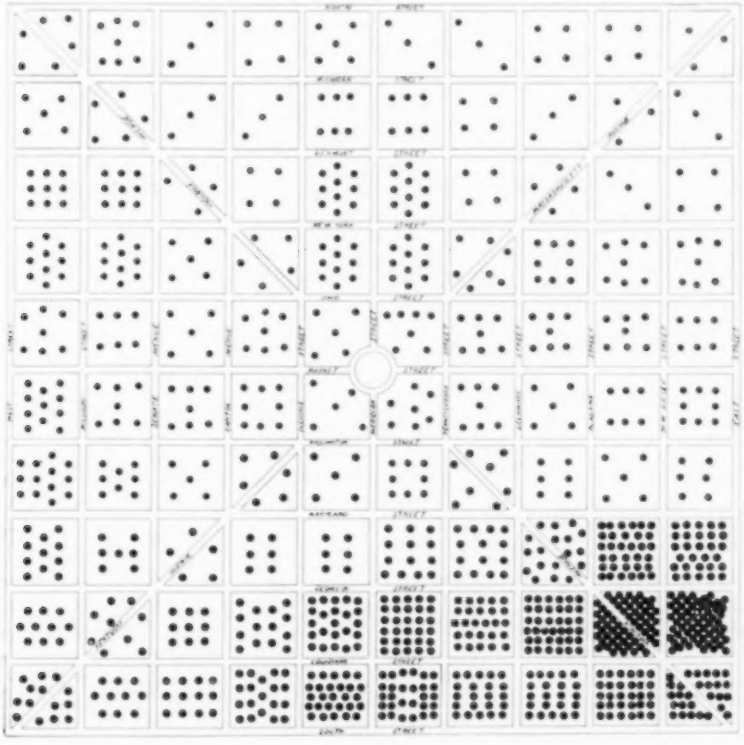
An analysis of the material deposited showed a volatile carbon content of 17.2 per cent. and an ash content of 56.96 per cent. The British thermal units or calorimetric value of the deposited material was 3,944. As compared with an ordinary soft coal, the material was very low in fuel value, consisting largely of ash. The ash content is interesting in that it shows the presence in the atmosphere of very large quantities of coal ash or mineral matter, a condition which is not usually suspected. This dust content is undoubtedly due to improper methods of stoking and the forced drafts that carry out of the flue the ash which properly should fall to the ash pit.

By far the largest quantity of soot and ash was found in the samples collected in the vicinity of the railroad tracks. For instance, the average deposition at Meridian Street and the tracks was 47.07 pounds per acre per day as compared with the average for the entire district of 10.28. At Pennsylvania and the tracks the deposition was 26.72; at Alabama Street and the tracks, 47.82; at New Jersey Street and the tracks, 60.26; at East Street and the tracks, 41.04. The northern boundaries of the "mile square" show a relatively low soot content. At North and West Streets the deposition was 3.08 pounds per acre per day; at North Street and Capitol Avenue, 2.68; at North and Meridian, 1.50; at North and Pennsylvania, 2.54; at North and Delaware, 4.73; at North and New Jersey, 1.99; at North and East, 4.12.

Very low figures were obtained on samples collected at Ritter Avenue and Washington Street in Irvington where deposition of 0.85 pounds per acre was noted and at University and Audubon Road where the deposition was 0.96.

One of the worst conditions was in territory contiguous to the city hospital at Indiana and Athon streets where the deposition was 65.97 pounds per acre per day and at Hadley and Blake streets, 70.89.

The residential territory north showed a low deposition. At Pennsylvania and Sixteenth streets the amount was 1.05; at Pennsylvania and Twenty-first streets, 1.58; at Alabama and Twenty-first streets, 0.94; at Central Avenue and Twenty-first Street, 1.50; at Park Avenue and Sutherland Avenue the deposition was 0.68; at College Avenue and Fall Creek, 0.77.



This map was made up by W. D. McAbee, of the staff of the State Board of Health, to show the relative cleanliness of various parts of the mile-square downtown. The black spots indicate soot deposits. The number of the square was estimated from actual calculations of the amounts of soot deposited on snow during fixed periods and over definite areas in different parts of the downtown section. The snow and coal carbon over the areas tested were scraped together into receptacles and then the water was eliminated, showing how much dirt was deposited on that area. The section of the map representing the vicinity of the railroad tracks and the Union station is seen to be the depository for the most grime.

These figures are interesting in showing the relatively small quantity of soot and ash deposited in the residential district where, although much soft coal is burned, the atmosphere is far less heavily laden than in the manufacturing or railroad districts.

An examination of the map plainly shows the concentration of the soot and the great influence upon the atmosphere of the engines operating trains into the Union Station and adjoining freight yards.

THE CONTROL OF TEMPERATURES IN THE PASTEURIZATION OF MILK.

CHARLES H. KILBOURNE,

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In the August number (1912) of the AMERICAN JOURNAL OF PUBLIC HEALTH there appeared an article by me dealing with the pasteurization of milk, in which I made suggestions concerning the apparatus to be used for this purpose. In this article, mention was made of a somewhat new method of controlling the temperature to which milk is heated in the pasteurizing plants, which method is not at present in use at any pasteurizing plant so far as I know. I wish to elaborate a little more fully the manner in which this method could be applied to any form of milk heater which is in use at the present time without making changes which would involve any great expense.

There can be no question that the pasteurized milk which is the most desirable, conforms to the following conditions:

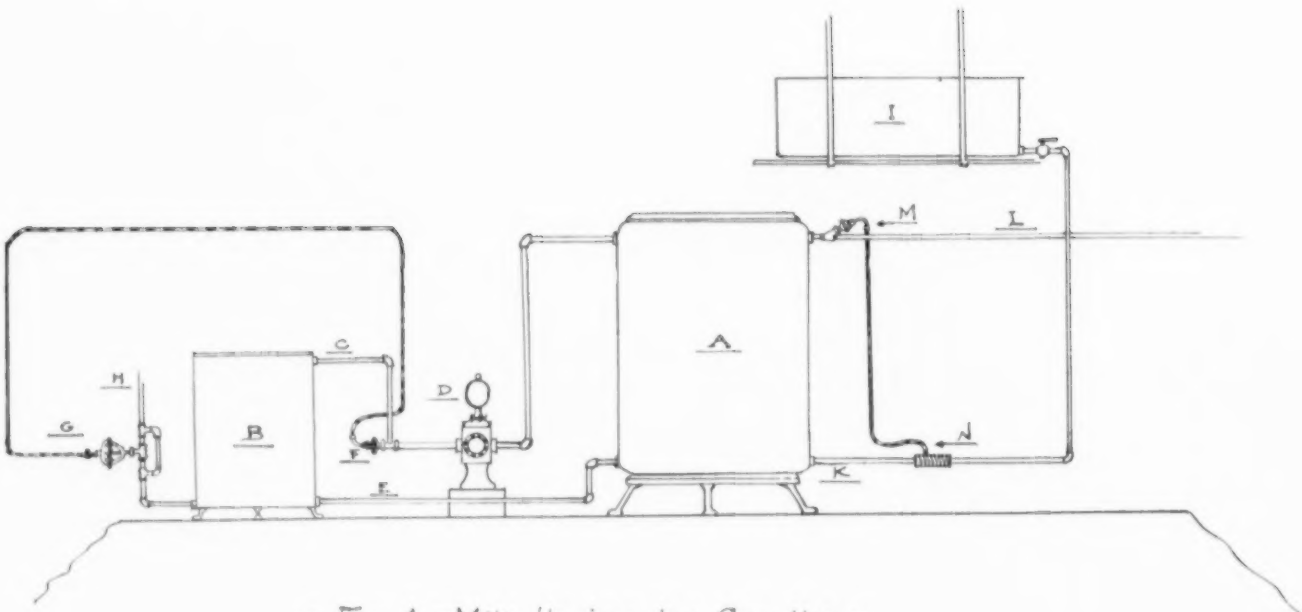
First.—The milk should be free from dangerous toxins which may result from the growth of an excessive number of bacteria present in the milk before being pasteurized.

Second.—All pathogenic bacteria should be destroyed and this involves, of course, the destruction of a large percentage of all bacteria contained in the milk.

Third.—The milk should not be subjected to an extremely high temperature since this would result in changing the constituent parts of the milk, give rise to a scorched or cooked taste, and interfere with what is known as the "cream line" when milk is bottled. Such milk would satisfy the demands of health authorities and would also be desirable from the standpoint of the milk dealer.

The point which I wish to emphasize in this article is the control of the temperature to which milk is heated.

The usual method of applying heat to the pasteurizer is either to introduce the steam directly into the heating chamber or to introduce it into the water which flows into the heating chamber. In either case, the chances are very great that some steam will strike the heating surface before it has become condensed and it will therefore cause some portions of the heating surface to become superheated. The milk which strikes these superheated points will be scorched and will impart a scorched taste to the whole body of milk, although the average temperature of the milk leaving the apparatus may be well below the temperature to which it is considered safe to heat it. In the ordinary pasteurizer also, the flow of milk is continuous and uniform, and it is the custom to regulate the temperature of the heated milk



– Fig. 1.–Milk flowing by Gravity –

A–Milk Heater.
B–Water Heater.
C–Water Discharge to Milk Heater.
D–Water Pump.
E–Water Return Pipe from Milk Heater.
F–Thermostat in Water Discharge Pipe.
G–Control of Stream Valve.
H–Steam Pipe to Water Heater.
I–Milk Tank.
K–Cold Milk Pipe to Heater.
L–Hot Milk Discharge Pipe.
M–Thermostat.
N–Valve Controlling Milk Flow.
O–Milk Pump.
P–Valve Controlling Steam.
R–Steam Pipe to Milk Pump.

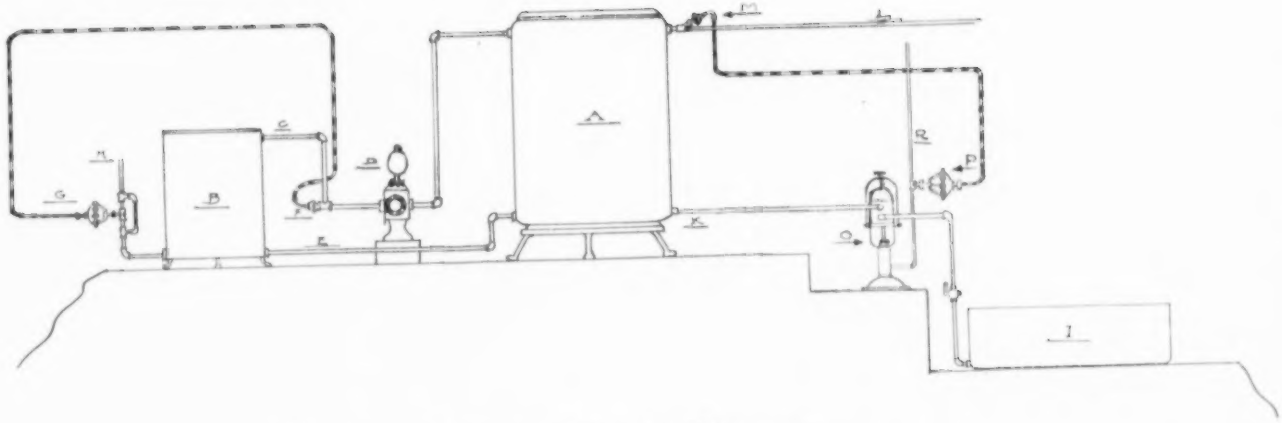
by varying the amount of steam which is introduced into the heating chamber.

In order to prevent superheating, it is desirable that the milk heating apparatus be so constructed that the heated surface with which the milk comes in contact shall never reach a temperature more than 15 degrees F. higher than that at which it is desired that the milk shall leave the apparatus. Since the milk temperature which authorities consider to be the most desirable is 145 degrees F., this means that the heating surface shall never have a temperature higher than 160 degrees F. Several manufacturers of apparatus for pasteurizing milk are now securing this condition by providing a separate tank outside of the milk heater, in which tank water is kept at a uniform temperature of say 160 degrees by means of a thermostat placed in the pipe through which this water is conveyed to the heater and controlling the flow of steam into the water tank. This heated water is then pumped through the milk heater. The greatest milk heating efficiency is obtained from hot water when it is moving rapidly through the heater and back to the water tank, in which case it will lose not over 5 degrees in temperature when returning to the tank.

So far so good.

The problem now presents itself of preventing the milk from falling below the desired temperature of 145 degrees F. when leaving the heater. Such a fall in temperature may result either from the milk being forced too rapidly through the heater and thus being discharged before it has time to take up sufficient heat from the hot water, or it may occur when the temperature of the inflowing cold milk suddenly drops below the usual point. This frequently happens when milk is received from farmers whose methods of cooling milk are not uniform.

When the water in a heating tank is kept at a uniform temperature by means of a thermostat, two methods are open for preventing the milk from dropping below the minimum temperature required. One of these methods is to so increase the heating surface in the milk heater that there will be such a wide margin of safety that no variation in the rapidity of milk flow and no variation in the temperature of the inflowing cold milk can be sufficiently great to cause the heated milk to fall very low in temperature. So far as I know, this is the only method now employed by any manufacturer of pasteurizing apparatus. This method, however, has this disadvantage that the largely increased heating surface requires a great deal of extra labor in cleaning the apparatus, and there is also the added increased danger from the leakage of the water into the milk when pipes are used which are liable to break. There is, however, another method open for controlling the temperature, namely, by attaching a thermostat to the outlet pipe through which the hot milk leaves the



-Fig. 2.- Milk pumped by Steam -

A–Milk Heater.
B–Water Heater.
C–Water Discharge to Milk Heater.
D–Water Pump.
E–Water Return Pipe from Milk Heater.
F–Thermostat in Water Discharge Pipe.
G–Control of Stream Valve.
H–Steam Pipe to Water Heater.
I–Milk Tank.
K–Cold Milk Pipe to Heater.
L–Hot Milk Discharge Pipe.
M–Thermostat.
N–Valve Controlling Milk Flow.
O–Milk Pump.
P–Valve Controlling Steam.
R–Steam Pipe to Milk Pump.

heater, this thermostat to control the flow of the cold milk into the apparatus.

It is evident that when the rapidity of flow is checked more heat will be taken up by the milk in its passage through the heater.

The accompanying cuts illustrate the method here described.

Figure 1 shows the arrangement of this device when the milk flows by gravity into the heater. The thermostat M controls the valve N located in the pipe through which the cold milk flows to the heater.

Figure 2 shows the arrangement of the device when the milk is pumped through the heater by means of a steam pump. In this case, thermostat M controls the valve P, regulating the steam which operates the pump, causing it to increase and decrease its speed. This in turn, of course, controls the flow of milk into the apparatus.

It is very probable that the idea here involved is patentable, but I have no desire to take any advantage of this fact. I have in the last year suggested this new method of control to many manufacturers and milk dealers and I now desire to make it known in a more public way, hoping that some interested party will make use of the idea which appears to be sound in theory and practical to use and should secure automatically a uniform temperature in the milk.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

The annual meeting of the Massachusetts Association of Boards of Health was held at the Brunswick Hotel, Boylston Street, Boston, Thursday, January 30, under the presidency of Dr. Henry P. Walcott.

On the recommendation of the Executive Committee the following new member was elected:—

Dr. George T. O'Donnell, Billerica.

Report of the Treasurer.

Doctor Curtis: Mr. President, I have here a brief account of the situation of the Association for the year.

Receipts.

Balance from 1911		$1,475.84
Annual dues 1911	$819.00	
Annual dues, 1912	475.00	
Balance of collection July meeting	12.00	
Interest on balances	46.56	
		552.56
		$2,028.40

Expenses.

Printing, etc., for the Secretary	$80.14	
Printing, etc., for the Treasurer	28.00	
Printing for Milk Committee	3.50	
		$111.64
Clerical assistance for Secretary	$12.00	
Clerical assistance for Treasurer	7.00	
		19.00
Arthur T. Lovell, reporting meetings		66.80
American Public Health Ass'n three issues of Journal		193.00
Cigars		30.28
Sundry small items		3.83
Crêpe paper for July meeting	$3.00	
Rubber stamp for Treasurer	.83	
Total expenses		$424.55
Balance to 1913		1,603.85
		$2,028.40

Of the above balance $1,040.40 is in the West Newton Savings Bank and $563.45 on deposit in the First National Bank of West Newton.

The item for cigars is rather large, but there were three bills of the previous year which had been forgotten by the Brunswick.

The agreement with the American Public Health Association in regard to printing the JOURNAL which was in existence last year has just been renewed, so that it will be continued in the same way for the coming year.

Respectfully submitted,

FRANCIS GEO. CURTIS,
Treasurer.

REPORT OF THE LEGISLATIVE COMMITTEE.

The Legislative Committee submits the following report on matters pertaining to public health that have been introduced up to this time at the present session of the Legislature.

Senate 42, introduced by the Massachusetts Milk Inspectors' Association, calls for the establishing of a standard for cheese. It is in the interests of pure food.

Senate 43, introduced by the Massachusetts Milk Inspectors' Association, calls for the establishing of maximum amounts of water to be allowed in butter, renovated butter and oleomargarine. In the interests of pure food.

Senate 44 is the official bill of the Massachusetts Association of Boards of Health. In fixing a state standard for bacteria permissible in milk intended for sale it does not render it mandatory for local boards of health to enter upon the work unless they so desire, but does give to the State Board of Health the authority long needed by them to proceed against dirty milk. Kindly instruct your representatives in the Legislature to assist this important measure to become law.

Senate 45, introduced by the city of Boston, calls for definition of terms "milk" and "pure milk" as used in certain statutes. In the interests of pure food.

Senate 46, introduced by the city of Boston, is mainly similar to Senate 45.

Senate 47, introduced by the city of Boston, is the bill that has appeared for two seasons past and which has twice failed. It authorizes the issuing of "permits" for sale of milk and cream by local boards of health. Such authority would be of value to local boards, but our efforts should be concentrated on Senate Bill 44.

Senate 72 was introduced by Dr. Lyman A. Jones of North Adams. It allows county commissioners to establish county laboratories if they so desire. In the western part of the state there seems to be some demand

for a county laboratory, owing to the length of time that it takes to get specimens down to Boston to the State Board. This is not mandatory upon county commissioners, but is permissible.

Senate 91, introduced by the city of Boston, provides for cleanliness of milk containers and utensils. Desirable legislation.

Senate 92, introduced by the city of Boston, provides for establishing a bacterial standard for milk. The subject is far better and more fully covered in Senate Bill 44. This bill is unnecessary.

Senate 118, introduced by the city of Boston, provides for the exclusion of certain deleterious substances from confectionery. In the interests of public health.

Senate 119, introduced by George S. Fuller, calls for the proper labelling of insecticides. Desirable legislation.

Senate 163, introduced by F. S. Richardson, restricts the use of the common drinking cup, and is a bill carrying a little farther the common drinking cup law which is already upon the statute books. It is in the interest of public health.

Senate 170, introduced by John Griffin, is one of the three bills which provides for reorganization of the State Board of Health, and in the opinion of your committee ought not to pass.

Senate 340, introduced by J. L. Johnson, provides for the establishment of a standard of ice cream. In the opinion of the committee the standard established by this bill is too low, as it provides for 8 per cent. fat in ice cream, whereas the Federal standard provides for 12 to 14 per cent. of fat.

House 92, introduced by Thomas J. Giblin, provides for the marking of articles of food that have been held in cold storage, and appears to be desirable legislation.

House 93, introduced by the city of Boston, prohibits the sale of confectionery containing mineral substances. As mineral matter is a natural component part of many of the materials now used in the manufacture of confectionery, it is felt that this bill is somewhat ambiguous.

House 97, introduced by the city of Boston, calls for the establishment of a department of diseases dangerous to the public health by the State Board of Health, and appears to be desirable legislation.

House 283, introduced by the city of Boston, calls for the establishing of a standard for cheese. This is similar to Senate Bill 42, but is not quite so complete.

House 284, introduced by the city of Boston, calls for the establishing of maximum amounts of water to be allowed in butter, renovated butter and oleomargarine. It is similar to Senate Bill 43, but not quite so complete.

House 351 is a resolve in regard to the expenditure of $10,000 for a State Board of Health investigation of infantile paralysis. That has been done for some years.

House 352 calls for weekly reports to the State Board of Health by local boards of health in regard to certain diseases, and this appears to be desirable legislation.

House 353 is a bill, recommended by the State Board of Health, relative to the sale of drugs, differing from the professed standard under which they are sold.

House 393 is the Ellis Bill, introduced this year by Richard M. Bradley. While there appear to be a number of small contradictory provisions in this bill, and while it appears to deprive local boards of health of revenue now received from milk licenses, on the whole this bill appears to be fair and should be endorsed by this Association.

House 481, introduced by the Massachusetts State Branch of the American Federation of Labor to reorganize the State Board of Health, would substitute for the present board a paid board to consist of five members, "one of whom shall be a sanitary engineer, one a pharmacist and three of them persons learned in the sciences of medicine and hygiene." While there are some good features about this bill, your committee is not prepared to recommend its enactment.

House 482, introduced by Andrew Moran, Jr., to insure the purity of vaccine virus. This appears to be aimed at the general idea of vaccination, and your committee urges its defeat.

House 856, introduced by P. Joseph McManus, to require labelling of receptacles for milk and cream containing formaldehyde or other preservative. As the statutes expressly forbid the use of any preservative in connection with milk intended for sale this bill can serve no good purpose and its defeat is urged.

House 857, introduced by John F. Meaney, for labelling of milk as to its source and treatment. This bill has merit. Your committee is of the opinion, however, that the section giving authority to local boards to designate terms or phrases should be delegated to some state authority, such as the State Board of Health and Dairy Bureau, jointly, in order to prevent possible multiplicity of phrases.

House 961, introduced by George C. Stearns, who is the secretary of the Massachusetts Association of Relief Officers, practically the overseers of the poor, is relative to the expense of caring for persons infected with diseases dangerous to the public health. This bill will affect local boards of health, in that it is a measure which is intended to place upon the boards of health the determination of settlements, which is now done by the overseers of the poor. This bill transfers from the overseers of the poor to local boards of health the determination of settlements in cases of communicable diseases, or diseases dangerous to the public health, which are cared for by local boards of health. You know that now a case that is reported to your board is referred by you to the overseers of the poor to determine

the settlement. This bill will take that determination away from the overseers of the poor and put it back upon you as a board of health, and in view of the fact that the settlement laws are intricate and that overseers of the poor have done this work for years and have the necessary machinery, your committee is of the opinion that this bill should be defeated.

Finally, House 964, introduced by Edward F. McSweeney, calls for reorganization of the State Board of Health. It calls also for carrying out of its rules by local boards of health, who at the discretion of the State Board of Health may be subjected to fines of $25 to $500 or to imprisonment for six months, or to both such fine and imprisonment. Your committee feels that members of local boards of health have already troubles enough without such possibilities hanging over them, and urges the defeat of this bill.

GEORGE E. BOLLING,
Chairman.

It was moved that the report of the Legislative Committee be accepted and printed for the benefit of the local boards of Health of the Commonwealth.

(Motion was seconded and adopted.)

ELECTION OF OFFICERS.

DOCTOR WOODS: I move that the chairman appoint a committee of five to bring in nominations for officers for the ensuing year.

DOCTOR KENNEDY: I move as an amendment that officers be nominated from the floor. I should like the President and Vice-Presidents nominated from the floor.

THE PRESIDENT: The question is upon the amendment offered by the gentleman upon the right. Are you ready to vote?

(Upon a viva-voce vote the result was in doubt. A hand vote was taken and the amendment was rejected, 9 for, 15 against. The original motion was then adopted.)

THE PRESIDENT: I will appoint as members of that committee Dr. Woods, Dr. Stevens, Dr. Tobey, Professor Phelps and Dr. Kennedy.

DOCTOR WOODS: Mr. Chairman, the Committee on Nominations wish to report the following:

For President, Dr. S. H. Durgin, of Boston.

For First Vice-President, Prof. W. T. Sedgwick, of Brookline.

For Second Vice-President, Dr. C. V. Chapin, of Providence, R. I.

For Secretary, James C. Coffey, of Worcester.

For Treasurer, Dr. Francis G. Curtis, of Newton.

For the Executive Committee (for two years): Dr. M. V. Pierce, of

Milton; George E. Bolling, of Brockton; Dr. H. L. Chase, of Brookline; W. L. Underwood, of Belmont, and Dr. F. A. Woods, of Holyoke.

It was moved that the Secretary be authorized to cast one ballot for the names reported by the committee.

Papers Presented.

The following papers were then read:—

"How Shall We Spend the Health Department Appropriation?" by Dr. C. V. Chapin, Providence, R. I.

"Casual Observations on Sanitary Matters Gathered in Germany," by Dr. Theobald Smith, Harvard University.

Retirement of Dr. Walcott as President.

Doctor Stevens: My object in rising is to move that the thanks of this Association be presented to Doctor Walcott, our retiring President, for his long and faithful service as President of this Association.

Professor Sedgwick: I second the motion, and may I make a few remarks? Gentlemen of the Association, the announcement that Doctor Walcott will no longer be our president comes as a great surprise. I think it is only the older members, like Doctor Durgin and myself, who have perhaps the fullest knowledge of the great service which Doctor Walcott has done, not only to this Association, but to the whole state of Massachusetts and to sanitary and medical science all through the United States. Doctor Walcott has brought distinction to this Association by his long presidency of it, and we as members ought to feel, and do feel, very proud that we have had him for so long a time as our presiding officer. His name is known all over the world. We all felt pride when he was chosen as the president of the great International Congress of Hygiene and Demography in Washington last September, over which he presided with so much skill and dignity, but as members of the Massachusetts Association of Boards of Health we have tenfold cause to be grateful for his long service to us. Doctor Walcott began his great work for this state many years ago; I think it is more than thirty years ago, certainly about thirty,—I mean in an official capacity. He was early connected with all those movements which afterward ripened into the work of the State Board of Health,— the reorganized board which dates from 1886. He was on the old Board of Health, Lunacy and Charity. He was on the Massachusetts Drainage Commission, which attacked metropolitan sewerage problems in the late eighties, and he more than any man in New England has shaped the progress of public health science in this state and in all New England if not in America. If, therefore, he is to resign his post at this time he ought to have and will have our heartiest thanks and our congratulations

upon the great work which he has been able to do for the state and the nation, as well as for this little Association which has held us altogether so many years as believers in sanitary science and public health matters and has been an example to the rest of the country in the good work that it has done.

Doctor Durgin: Gentlemen of the Association, I feel, as I think all of you feel, exceedingly sorry that the time has come when we can no longer persuade our graceful and logical head of the Association to remain. We have been doing it for a great many years, and he has reluctantly but kindly yielded to the importunings until the present time. We all know what it means to have an association led along with such even, peaceful and successful work. This Association has passed from a small handful to a large sized and successful organization. We can only hope by pulling together very hard in the years to come to keep up with the progress which we have been blessed with in the last twenty-two or twenty-three years. He is not only the logical and pleasing leader of the Association, but he has been the wise counsellor, which he has been in all other positions and affairs in the public health work with which he has been connected in this country. No one can feel this more than I do at the present time, and I feel it particularly because I have been persuaded against my wishes to take his place.

I thank you, gentlemen, from my heart, for this new expression of your confidence. Let us pull together, but never forget our great loss of so graceful a head as has retired today.

The President: Gentlemen, I need not say that it has been somewhat embarrassing to sit here and listen to these very kind expressions. I do not feel, however, that I should be honest to myself if I did not repeat what I have often said, that this Association seemed to me upon the whole one of the most valuable organizations in the state of Massachusetts that had anything whatever to do with the questions of the public health. I have always believed that the real administration of the public health of this Commonwealth rested with the local boards of health. There is a State Board of Health at the State House, but I have always insisted upon it, and I think the board has agreed with me in this, that its functions, except in a very few instances, must be advisory functions, that it must not attempt to meddle with the local administration of the public health where the laws of the Commonwealth have so safely left it. There must be advice, there must be the assistance of the Commonwealth for a great many questions, but the questions that mean more to the people of this Commonwealth than any others are the questions that should be decided within the limits of each municipality of this state. I therefore have taken an immense interest in the well-being of this Association. I don't agree at all with Doctor Durgin that I have been anything more than an associate here

who has endeavored at all times to carry out the wishes of the body which was good enough to ask him to preside over it, and I am very sure that whatever service at any time I may have been able to render here, Doctor Durgin can render at least an equal one, my own feeling is a greater one, because he really has borne more of the responsibilities of the work of this Association than I have. I believe, gentlemen, that the Association is entering upon a period of greater success than it has ever had.

(The motion to extend a vote of thanks to the retiring President, Doctor Walcott, was put by the President-elect, Doctor Durgin, and was adopted unanimously.)

BOOK REVIEWS.

Sex Education. *By Ira S. Wile, M.S., M.D. 12mo. pp. 148. Duffield and Co. New York, 1912.*

This is a somewhat superior specimen of the host of manuals now in print regarding the subject indicated by the title. It is aimed particularly to guide fathers and mothers in giving instruction to their children at different periods. Three of these periods are recognized, first, that of childhood, "The Age of Mythology." This is described with much insight and sympathy as an age uncolored by sexual feeling when the facts of birth can be discussed in a most matter-of-fact way. The second is that of puberty, "The Age of Chivalry," in which the maintenance of confidential relations is far harder but not less necessary. Later adolescence is thoughtfully characterized by the author as "The Age of Civic Awakening," a time when duty toward society may be urged with some success as a ground for personal self-control.

The book is written with literary skill and Doctor Wile is to be commended for giving far greater emphasis to high ideals for conduct than to the possible penalties for delinquency.

Percy G. Stiles.

Home Hygiene and Prevention of Disease. *By Norman E. Ditman, M.D. 12mo. pp. 333. Duffield and Co., New York, 1912. Price $1.50.*

This is a small encyclopædia treating in alphabetic succession a series of topics related to health and disease. Common ills both trifling and grave are discussed and measures preventive and remedial are proposed. It is difficult to judge how far such a book is likely to serve its purpose in the hands of the average layman. It is distinctly entertaining and he will probably enjoy random readings concerning disorders which are not familiar to him by experience; whether it will greatly help him in solving his own personal problems is more questionable. Its statements seem generally accurate if a little dogmatic. The prominence given to drugs useful in different cases appears undesirable. The size of dose is carefully mentioned each time and the tendency to encourage self-treatment, often with powerful medicines, is to be deplored. The author himself warns against this in his introduction but his word of caution might too easily be overlooked. There is a sane and charitable section upon the use of alcoholic beverages.

Percy G. Stiles.

American Pure Food and Drug Laws, *by James Westervelt, M. A., of the New York, New Jersey Bars. 1535 pages bound in buckram, price $7.50. Vernon Law Book Co., Kansas City, Mo., 1912. (Can be ordered through this Journal.)*

This book will be indispensable to all actively engaged or interested in the administration of the pure food and drug laws of this country. The introductory chapter on the purpose and scope of federal and state laws is followed by a very admirable exposition dealing with the administration and enforcement of the laws and then specific chapters dealing with adulteration, misbranding and special laws. The laws of every state in the Union have been carefully collected, collated, and abstracted in such a way that one can get information very quickly without having to laboriously wade through great quantities of material. The book is supplied with a very thorough index.

PUBLIC HEALTH NOTES.

Poliomyelitis and Dogs.

H. F. Langhorst, M.D., in the *Journal of the American Medical Association*, for December 28, 1912, considers the possibility of the transmission of poliomyelitis through the dog. He calls attention to Professor Rosenau's findings concerning the stable-fly, reports two cases in which dogs may have been instrumental in infection, and briefly presents his own theory as follows:—

"Poliomyelitis is undoubtedly transmitted to man through more than one intermediary. We know one to be the biting fly. We also know that the monkey may harbor the infection for some time after being a victim of the disease, and thus be a carrier. The biting fly attacks animals and transmits the contagion. The dog is subjected to the bite of this fly and may become infected. The dog may contract the disease in one form or another, and be an active carrier of the virus for some time.

"Dogs are numerous in the countries that have suffered most with poliomyelitis; dogs are also more numerous in country districts, where the disease is most prevalent. I consider these facts significant, especially in connection with two cases in my practice in which dogs may have been the agents of transmission."

The Problem of Sanitation of Railway and Street Cars.

In a recent issue of the *Dietetic and Hygienic Gazette* (February, 1913), appears a very interesting editorial on the problem of sanitation of railway and street cars, which concludes as follows:—

"In both railway cars and street cars the main factors of good sanitation are heating and ventilating, and cleaning. Cars are too frequently designed for show and rapid handling of passengers than with the view of proper ventilation, adequate heating and of rendering the car accessible for thorough cleaning.

"Many cars, gorgeous to the eye, in plush and hangings, are really whited sepulchres. Their appointments and construction make it difficult, well-nigh impossible, to clean them thoroughly and their plush and their hangings provide ever ready receptacles for dust and dirt. As to heating, the same thing may be said of American railway trains as of American rooms and buildings: they are almost always overheated.

"The reforms to be suggested in railway trains are (1) an adequate and sufficient system of heating and ventilation; (2) the abolition of the present style sleeping car and the substitution of sleeping accommodations, healthier and more efficient; (3) the construction of railway cars and street cars on more simple lines to facilitate proper cleaning. If physicians and the community at large will insist that measures of this kind are in the interest of the public health and must be undertaken, the poor, hardly used railway companies cannot but bow to the inevitable."

Birth Registration.

"The Children's Bureau devotes this its first monograph to birth registration, because the adequate recording of births is fundamentally necessary to the studies of child welfare which the Bureau is directed by law to undertake, and, more important, because universal birth registration will prove of great practical value to the people of the United States."

Thus the Bureau's recently published monograph introduces the subject of birth registration, and deals, in the first place, with its importance as a basis of the study of infant mortality. The pamphlet gives Dr. Cressy L. Wilbur as the authority for the statement that "approximately 300,000 babies die yearly before they reach the age of twelve months." It is estimated by the Bureau of the Census that "in the last decade (1901–1910) more than 2,500,000 of the children born in this country died before they reached the age of one year."

"What do these figures mean? In terms of total population, it is as if Chicago, the

second city of the United States, were to be wiped out of existence once every ten years, not a single life being saved. It means the annihilation each decade of a population as large as that of the State of New Jersey, and greater than that of such States as Alabama, California, Iowa, Kentucky, Minnesota, North Carolina, Tennessee, Virginia, or Wisconsin. In fact, only ten States in the Union had each in 1910 a population as great as the infant mortality for the preceding decade. This mortality nearly equalled the combined population of Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada.

"If none of these infant deaths was preventable, we should have no stimulus for trying to find a remedy; we should be obliged to bow to the inevitable. But we are assured by the highest authorities that the number of deaths can be greatly reduced if we apply the best methods of the growing science of sanitation. This challenges the attention and the earnest efforts of all public spirited men and women. When we are told by the New York City health department that 'Public health is purchasable; within natural limitations a community can determine its own death rate,' we must entreat even the busiest to pause long enough to do what he can, in his own way, to set in motion the machinery through which this sacrifice of life may be checked."

The Causation of Pellagra.

An interesting article on the causation of pellagra appeared in the January 25th, 1913, issue of the *Journal of the American Medical Association*. After pointing out the facts bearing on the question, the authors, Allan H. Jennings and W. V. King, reached the following conclusions:—

"If pellagra is caused by an infection, especially if of protozoal origin, and is transmitted by an insect, the present state of our knowledge leads us to the provisional belief that the following deductions may be tenable.

"Under the conditions existing in the region of pellagrous endemicity in South Carolina, the lice, fleas, mosquitoes and bedbugs show characteristics of habit, distribution and abundance which appear to exclude them from serious consideration in this connection.

"The biting habits and, to a certain extent, the distribution of the flies of the genus *Simulium*, together with their lack of habits which bring them into close association with man, seem to present weighty arguments against the incrimination of these gnats as the active agent in the transmission of pellagra.

"The cosmopolitan biting stable-fly, *Stomoxys calcitrans*, from its distributional and biting habits, its close association with man, its conformation to the obvious requirements of the disease-transmitting insect and the agreement of its special characteristics with the phenomena incident to the occurrence of pellagra, offers strong reasons for its consideration under the premises.

"It is hoped that attention may be directed to this fly and observations bearing on its possible relation to the disease be generally made.

"We would add that, should a causative organism be shown to exist which is a bacterium rather than a protozoon, and should this organism invade the body through either the mouth or the skin, the house or typhoid fly, *Musca domestica*, and the flies whose habits at all resemble it, would lie under strong suspicion. It is needless to say that the house-fly is excessively abundant and of universal distribution in the region studied.

"We are also aware that the communication of pellagra in a purely mechanical manner by biting insects is a possibility and, if shown to exist, would radically change our ideas as to the insects which may be involved.

"Finally, we wish to repeat that essential uniformity of causation must be assumed to exist universally and that the demonstrated failure of a supposed etiologic factor to account for the phenomena of pellagra in one locality must serve to exclude it from consideration as a factor in another."

Malaria Near Farmhouses.

"Senior Surgeon Henry R. Carter, in *Public Health Reports No.* 105, summarizes the information we have concerning the spread of malaria, a disease, as he says, essentially rural in its occurrence, for the benefit ap-

parently of dwellers in the country. The characteristics of the guilty mosquito are fully described as well as its habits, how it travels and breeds, and how its surreptitious nocturnal invasion of houses has led to the bewilderment of men trying to account for an outbreak of malaria where no evidence of the presence of anopheles was discoverable.

"The article goes on to describe the measures involving the control of the human host by keeping him under screens and mosquito bars, administering quinine freely, killing the mosquitoes of the sickroom, and rendering possible carriers innocuous by the prophylactic use of the specific alkaloid. To control the insect host, Surgeon Carter advises the destruction of their breeding places by drainage, enabling fish to get at the larvæ, pouring coal oil on larger ponds, cutting down brush and tall weeds about the house, yet planting a screen of trees between possible breeding places and the dwelling, use of screens and mosquito bars, etc. Full instructions are given how to construct the wire screens, including the doors. An interesting point is that collections of dirty water are not to be feared, as mosquitoes will not breed therein. It is to be hoped that some brave pioneer farmer, not susceptible to ridicule, will be found in every infested locality to carry out Surgeon Carter's excellent advice."

New York Medical Journal, January 25, 1913.

Important Milk Resolutions.

The conference of the delegates appointed by the governors of the Eastern and Middle States, called by the New York Milk Committee to consider improvement of state laws for the control of milk industry and for the suppression of tuberculosis met in New York February 5 and 6, 1913.

The following recommendations were adopted by the delegates and were based essentially on the findings of the National Committee on Milk Standards published by the United States Government last year. The resolutions are here given in full:

Resolved, That the inspection of dairy farms should be under the supervision of the state authorities.

Resolved, That the state control of the dairy inspection should be centralized in the Department of Agriculture or the department having jurisdiction over live stock.

Resolved, That it be the function of the State Department of Agriculture, or department having jurisdiction over live stock to perform the following work: Veterinary inspection of dairy cattle including physical examination and tuberculin tests, sanitary inspection of dairy barns and their surroundings, water supply, drainage systems, etc.

Resolved, That the following work be performed by the State Department of Health: Medical inspection of dairy employees and milk handlers at creamery and shipping stations; sanitary inspection of human dwellings, water supply, drainage systems, milk houses, shipping stations, factories, etc., and laboratory tests of milk.

Resolved, That the state milk control extend over the manufacture and handling of milk products.

Resolved, That all dairy herds be registered, classified and graded by the State Department of Agriculture as follows:

Class A—herds tuberculin tested and physically examined.

Class B—herds not tuberculin tested but physically examined.

Class C—herds not tuberculin tested and not physically examined.

Resolved, That all dairy buildings, equipment and methods be registered, classified and graded by the State Department of Agriculture as follows:

Buildings and Equipment.

Class A. Eighty per cent. and above, equal to 32 points and above on U. S. Score Card.

Class B. Sixty per cent. to seventy-nine per cent. equal to 24 to 31 points on U. S. Score Card.

Class C. Below sixty per cent. equal to below 24 points on U. S. Score Card.

Methods.

Class A. Eighty per cent. or above, equal to 48 points on U. S. Score Card.

Class B. Sixty per cent. to seventy-nine per cent. equal to 36 to 47 points in U. S. Score Card.

Class C. Below sixty per cent. equal to below 36 points on U. S. Score Card.

Resolved, That milk as delivered on the market be classified and graded.

Resolved, That the control of local milk supply by municipal and town boards of health should include the following duties: issuance and revocation of licenses of local distributors; classification and labeling of milk; inspection by local inspectors of all places where milk is received, handled and sold; laboratory tests to determine the efficiency of pasteurizing machines and methods; maintain records of inspection and all laboratory tests; utilization of results of inspection and laboratory tests in conjunction with reports from the state authorities of dairy inspections in exercising control over milk distributors; educate the consumer in the value, use and care of milk.

Resolved, That it is unnecessary and inadvisable to demand the destruction of cattle reacting to tuberculin unless they show signs of generalized tuberculosis.

Resolved, That the dairy products from such cattle as react but do not show signs of tuberculosis on physical examination should be subjected to such measures as will render their products safe for the food of man or animal.

Resolved, That the payment for cattle slaughtered after reacting to the tuberculin test should be made only to the original owners.

Resolved, That all animals destroyed by the state should be paid for.

Resolved, That quarantine should be approved of as a means of protecting states against interstate traffic in diseased cattle.

Resolved, That it should be made illegal for any person to move cattle or sell them without permission of the state authorities if they have been warned by such authorities that they are diseased.

Resolved, That the cattle commissioners or those having charge of diseases of animals should have authority under the law to brand animals that have reacted to the tuberculin test or been condemned on physical examination.

Resolved, That all tuberculin tests be reported to the state authorities and these placed on file by the state authorities.

Resolved, That the physical examination of all animals by qualified veterinarians be made compulsory.

Resolved, That careful attention should be given by states in regard to disinfection of premises that have been inhabited by diseased cattle.

Resolved, That the several states empower those having supervision of the milk supply to cooperate with each other in reference to the control of interstate shipment of milk.

Resolved, That each state be urged to deal with the problems discussed as nearly in conformity with the resolutions endorsed as the local conditions permit.

Dental Hygiene: Its Real Significance.

"Until very recently the necessity of caring for the mouth and teeth of children has not been a matter of public interest. An important part of medical inspection in schools has been neglected. Medical school inspection is the most important work carried on by departments of health; it is one of the most important functions of the state.

"By the practice of dental hygiene the general public health can be greatly improved. In the fight against the great white scourge, tuberculosis, it is a factor of the first importance.

"Dental hygiene is the practical application of dental science to the individual, the home and the school. A realization of its importance is needed. Everybody should know that the general health of the individual and of the community depends largely upon the condition of the mouth and teeth; that the highest efficiency and happiness in life can not be gained when the gateway to the body is neglected.

"The care of the teeth is an important factor in the care of the child. The mental and physical efficiency of school children can be greatly aided by the proper care of the mouth and teeth. This is fully attested by experiments in Germany, which cover a wide field. There dental infirmaries connected with the schools have been in operation for a sufficient length of time to demonstrate:

"First—That the time expended in putting

the teeth in order was far less than the time formerly lost from toothache and disability caused by diseased teeth.

"Second—That the cost of keeping the teeth in order was more than compensated for by better health and a consequent reduction in medical expenses.

"Third—That the child became physically stronger, secured a higher average in his studies, was easier to control and was apparently happier.

"A clean mouth and clean teeth furnish one of the best protections against disease. A child forced to swallow the discharges from an unclean mouth, and having nutrition interfered with by his inability to chew his food, is unable to resist disease.

"The condition of the teeth is a telltale as to diet. They are the guards which stand at the gateway to the body, ready to divide the food into manageable portions, to bring peace of mind and healthful bodily activity. No greater kill-joy exists than dyspepsia, no more vicious a menace to life and efficiency obtains than disordered condition of the process of nutrition.

"Cancer of the stomach is notoriously a disease of gross feeders. Eighty per cent. of the cancers of the stomach arise from bolted food. If an ounce of prevention is ever worth a pound of cure it is keeping the teeth in good condition.

"This problem of dental hygiene is not altogether one of benevolence. It is in large measure a problem of economics. Health is needed for great industrial production. Every case of disease involves an immediate economic loss to the community in which such events occur. There is coming a great change in the practice of medicine, surgery and dentistry and a much greater proportion of the attention of these professions in hereafter to be devoted to prevention rather than cure."

Monthly Bulletin, Indiana State Board of Health, November, 1912.

The Death Rate per 1,000 of Population in the Age—Period over 55 Years.

In the report of the chief medical officer of the Local Government Board, England, for 1911–12 just issued is a study on "Arterial Degeneration and Premature Old-Age." A further statistical study has been made in the death rates in the later years of life, which begins by pointing out that progress has been made in the reduction of infant mortality during the past thirty years. The improved sanitary conditions of living had not so far shown but little results, in persons over 45 and none in those over 55.

In the table given (−) means a decrease in the death rate per 1,000 of persons living in any decade in an average population and (+) means an increase of deaths.

Age Period.	Male.	Female.
45–55 years	(−) 3	(−) 15
55–65 years	(+) 9	(−) 7
65–75 years	(+) 8	(−) 1

The report states "The increase in the death rate amongst men at ages 45–65, when 1841–45 is contrasted with the period 1861–65 to 1891–95 inclusive and the failure to decline during the same period of the death rate in women at the same ages are facts of great social importance, whatever explanation be given them.

"In view of the immense improvement in this country in the death rate during youth and early adult life . . . there can be no reasonable doubt that much mortality in adult life, which anticipates death in old age is preventable in character and should be prevented.

"Two circumstances have doubtless been largely instrumental in keeping up the death rate to an unnecessarily high figure. These are the rapidly increasing aggregation of people in towns and the associated industrial conditions affecting large masses of the people both male and female.

"At the age period 55–65 in man, however, there is no clear indication of material improvement, though improvement is shown in women at the same period of life. This continuance of an excessive death rate at a time of life when a man's experience may be regarded as especially useful to the community, evidently calls for investigation."

It has been suggested "that those subject at the ages of 55–65 to the causes of mortality during the last ten years 1901–10 were born in what was relatively speaking a pre-

sanitary period, were subjected in their early life to conditions more adverse to future long life than men have been whose birth is of more recent date. This suggestion does not explain international differences in the death rates at ages 55–65; but on this point it has to be borne in mind that the countries comparing favorably with England and Wales have as a rule experienced much less urban and industrial aggregation than this country."

At the age period 55–65 about one third of the deaths were due to diseases of the heart and blood vessels. . . . "A very large share of the high mortality from diseases of the heart and blood vessels is caused by degenerative changes at the ages 45–55 and 55–65 which form an important anticipation of senility in the tissues on whose integrity, life and health chiefly depend."

These quotations are made at length in view of the interesting discussion which has been going on in "the New York papers on the notable increase in deaths per 1,000 in persons after 45 years." The fallacy in the argument set forth mathematically viz.: That in any given population of 100 per cent. there must of necessity be a higher mortality in the later age periods, because of a larger percentage of lives carried over from early years seems apparent, when the total deaths in any period are divided by the total population for any given country for that age period as taken from the census.

The very extended investigations into *arterial degeneration* in the English Report while being purely pathological is invaluable in pointing out the relationship of these old-age changes in tissues; while from the hygienic standpoint, it is of extreme importance to the people of this continent where "rush" and competition have made life so strenuous with the facilities of railway, tramcar, telegraph and telephone, to consider whether or not the human machine is able to withstand the stress. Perhaps the illustration of the automobile which can do its 10,000 miles with but slight repairs if driven moderately as compared with that much used up by "scorching" before 5,000 miles are done may not be inapplicable.

Milk Standards.

"According to a French authority standard hygienic milk should have been put through the following processes:

"1. Analysis and testing to remove watered, skimmed, soured or low-grade milk. 2. Filtering or straining to remove mechanical impurities, such as hairs, dust, etc. 3. Pasteurization at a temperature above 176 degrees Fahrenheit and immediate cooling to about 40 degrees to destroy pathogenic microbes, such as those of tuberculosis, diphtheria, typhoid fever, etc. 4. Bottling or sealing in sterilized containers. It should then be kept at a low temperature until sold.

"The first country to establish this standard of milk was the Argentine Republic, which enacted statutory regulations as long ago as 1890. These were soon followed by similar laws in various European countries. In Argentina the treatment described has become obligatory."

Public Health Journal, January, 1913.

The Tuberculosis Question from a French Report.

"The board of health of the city of Paris has published its report on the tuberculosis question (and also on the cancer question) for the year 1911; it contains very interesting material that should be studied by every member of the boards of health of the large cities of our country.

"The Paris board of health has made observations on the tuberculosis question for eighteen years, during which time an attempt has been made to get at the root of the evil, that is, the elimination of such rooms and houses as from their position could be taken as breeding places of the disease. While the first twelve years did not show any improvements, as during this time the work was very much handicapped, there appeared in 1909 a change for the better. In January, 1905, 5,623 houses were designated as needing improvement, but of this number 1,090 were boarding houses which could not under the law be attacked, and of the rest, fifty have been torn down. Others have been improved, so that at present only about one-

third remain to be changed. The great disadvantage of the building laws of Paris is that for a dwelling house thirty metres high, a court of only six metres need be provided, and in a street of twelve metres width, houses may be built eighteen metres high. Thus, even comfortable apartment houses have a lack of court space. This drawback, by the way, is to be found not only in Paris, but also in London and Berlin, in which latter capital a room with very little air and light, generally used as a dining room, has received the name of *Berliner Zimmer*, as it is peculiar to houses found in the German capital. Our readers will be astonished at the statement coming from a Parisian source, that the French capital has the least space given for public places, gardens, and playgrounds of all the capitals of the world.

"The report accepts the English statement, that there is one death from tuberculosis to about five patients. The number of deaths for 1911 is given as 9,371, seventy-eight less than in 1910, 343 less than in 1909, and 891 less than in 1908."

New York Medical Journal, February 8, 1913.

Principles of Governing Water Pollution.

Mr. Paul Hansen sent a list of questions to one hundred and twenty sanitary engineers and officials upon the above mentioned topic. The following fundamentals seem to be the concensus of opinion as interpreted by Mr. Hansen:

1. No stream unless the entire watershed is owned or controlled can be maintained in original purity.

2. Streams can be maintained free from danger to public health, inoffensive and decently clean.

3. Water supplies may be drawn from moderately polluted streams, the extent of permissible pollution being determined by the limitations imposed by the art of water purification.

4. The desirability of maintaining fish life in streams is purely an economic matter.

5. Stream pollution is primarily a menace to public health.

6. Ascetic considerations and civic decency must always be factors.

7. The enforcement of general laws in the hands of central expert authority enabled to specify enactments forbidding water stream pollution is feasible.

Symposium, Edited by Paul Hansen. Engineering News, 67, p. 839.

Typhoid Outbreak at Cedar Falls, Iowa.

A sudden severe epidemic of typhoid fever at Cedar Falls described by A. L. Grover and R. B. Dole, in the *Engineering News*, 67, p. 526, offers an excellent example of the evident pollution of a spring supply considered above suspicion. The city is situated on Cedar River and has a population of 5,000, in addition to about 1,000 students at the State Teachers College. There has been little typhoid in the town previous to the present outbreak. Careful investigation of the milk supply showed that no milk man had a disproportionate number of cases among his customers and 16 per cent. of the people denied using milk in any form. The age distribution of the cases did not indicate a milk epidemic.

The water supply is from springs on the banks of the Dry Run. The springs issue from limestone one or two feet above the level of the river. The discharge is about 6,000 gallons per minute. The rock from which the springs issue underlies deep drifts in a large area of Iowa, but at Cedar Falls it forms a bed of the Dry Run and Cedar River and it is covered throughout the greater part of the city by coarse gravel five to fifteen feet thick. It is full of crack sand crevices. Many old dug wells penetrate the limestone in the city and are used for the disposal of slops and waste.

Chemical analyses of the water during four or five years past have not shown any contamination, and bacteriological examinations of several samples collected between November and January indicate serious contamination only at certain times. It is believed that heavy rains which took place on October 14 to 17, resulted in washing down an excessive amount of contaminating material, leading directly to the epidemic. The unreliability of analytical methods is pointed out.

Return Cases of Scarlet Fever.

"Those who are opposed to the treatment of scarlet fever in special institutions are always pointing to the comparatively large number of return cases of the disease which seems to be associated with isolation hospitals. The occurrence of such cases is very unsatisfactory, and when they are connected with small hospitals the medical officer of health or the medical superintendent frequently come in for criticism, and indeed, are often held responsible for circumstances which they cannot possibly control. This being so, any observations or investigations should be encouraged which are likely to throw light upon the cause of these return cases. For some years past, special inquiries have been made in Birmingham with respect to such cases, and since 1909, the inquiries have been entrusted to Dr. Shadick Higgins, the assistant medical officer of health. During this time swabs have been taken from the noses of certain of the infecting cases who were suffering from nasal discharge, suggestive of diphtheritic rhinitis. These swabs gave positive results so frequently, as to raise the question whether there might not be a connection between the presence of the Loeffler bacillus, and the recurrence of the return cases. For the elucidation of this point, swabs have been taken since December, 1910, from the nose and throat separately of the infecting case whenever a return case arose, as soon as possible after its occurrence. In a detailed and most interesting report on the whole subject Doctor Higgins has given the results of his investigations.

"During a period of about ten months, when 1,509 cases notified as scarlet fever were admitted to the isolation hospitals, there were 131 hospital return cases in the city. These 131 cases occurred in 89 houses, and three cases in three houses followed hospital isolation elsewhere than in Birmingham, one case coming from Coventry, another from Gloucester, and a third from St. John's New Brunswick. There were thus 86 houses with the infection of which the Birmingham hospitals may be considered to be concerned. As soon as possible after the notification of a return case, the primary cases were visited, and swabbed. In almost every case swabs were taken separately from the nose and throat, from the nose by rubbing the swab as far into both nasal cavities as the rigid swab holder would pass from the nostrils, and from the throat by well rubbing on and about the tonsils. Where there was ear discharge, a swab was taken from the ear. Out of 95 cases thus examined, there was a positive result from the nose only in 26 instances, from the throat only in two, and from the ear only in one instance. In two cases there was a positive swab from the nose and ear, and in six cases from the nose and throat. In the 85 houses from patients in which swabs were taken there was a positive result in 58 instances, and a negative in 27.

"Doctor Higgins prefaces his report by referring to the investigations of other observers as to the frequency of the presence of the diphtheria bacillus in the throats of normal persons. We have space only to mention the Massachusetts investigations, which involved the examination of over 4,000 persons. The throat and nose were examined in each case separately. In the case of 3,096 persons from communities practically free from diphtheria, mostly school children and inmates of institutions and hospitals, 1.4 per cent. of persons showed typical diphtheria bacilli, of which 0.9 per cent. had them in the nose, and 0.6 per cent. in the throat. Fifty-five of these positive cultures were tested, and five of them proved to be virulent. In the case of 1,154 persons, almost entirely children, in institutions where diphtheria had existed from one to eighteen months previously, the figures were higher, and it was found that 2.1 per cent. had the bacilli in the nose, and 1.5 per cent. in the throat. In this case, six of the positive cultures were found to be virulent.

"In his comments upon Doctor Higgins' report, Doctor Robertson, the medical officer of health of Birmingham, refers to the widespread prevalence of the germ of diphtheria, a fact which at first sight might tend to alarm the public. He points out, however, that many of the most dangerous germs are prevalent in the normal throat of a large num-

ber of people, and it would appear that when conditions are favorable, the organism becomes virulent and causes disease. We are glad to learn that Doctor Higgins is continuing his investigations with a view to elucidating the occurrence of the diphtheria germ so frequently in the throats of scarlet fever patients, and possibly thereby throwing some light on the occurrence of return cases of scarlet fever."

Medical Officer, February 1, 1913.

Chicago School for Study of Prevention of Accidents.

"There has been recently established in Chicago a school for the education of both employers and employees in the principles and methods of the prevention of occupational diseases and accidents. The school is in charge of the state factory inspector, whose duty it is, under the law, to see that health and safety devices are adopted.

"Beside a laboratory for the study of the causes of industrial accidents and diseases, there is a chemical laboratory, a model rest-room, a model emergency hospital, a museum of pictures and exhibits showing safety devices and a drafting-room for the preparation of plans and specifications for machinery guards; these plans and specifications will be furnished free to manufacturers. There is also a free reference library of 4,000 volumes on factory inspection, occupational diseases and welfare work.

"The facilities and equipment of the school are to be supplemented by lectures to foremen, superintendents, and staff physicians of industrial plants and to social workers and others regarding occupational diseases and hazardous machinery.

"On the teaching staff of the school is a physician who has made a special study of occupational diseases in this country and abroad, an engineer who is an expert in the guarding of hazardous machinery and a corps of inspectors who are specializing in the problems involved in their work. Working men and women are also encouraged to visit the school and receive instructions in the way to protect themselves or to have examinations made in case they believe they are suffering from diseases due to their occupation, in which case conditions responsible for their troubles will be inquired into and corrected. The bulletins of the department of state factory inspection will be issued from this school and distributed to manufacturers, workers, and others."

The Public Health Journal, December, 1912.

Liability for Purity of Water.

"An interesting opinion as to the scope of the Illinois workmen's compensation law has been rendered by the secretary of the bureau charged with its enforcement. Responding to a query put by one of the liability insurance companies, he construes the law to mean that a workman who becomes ill from drinking contaminated water supplied at a plant for the employees while at work is entitled to compensation under the law. The opinion is, of course, merely an executive one, and before passing into the Illinois law will probably go through the courts, though it should be noted that the matter is not now the subject of litigation. The construction placed on the law by the secretary assumes, in the first place, that the word 'injury' used in the law covers illness and industrial diseases as well. As to those diseases which have been proved to result from definite industrial conditions or deleterious materials, there is no doubt that the spirit of present-day compensation laws aims to include them. The difficulty will come when the attempt is made to trace occasional diseases to a particular source—as to the water supply. Unless there is an epidemic clearly due to water, the connection between a given typhoid case, for example, and B. coli in a particular supply would be difficult to prove. The further interesting question then arises as to responsibility beyond the factory owner, provided his supply is obtained from a water company or from the municipality. Manifestly a claim that would lie against the manufacturer under the workmen's compensation law might not give him a valid claim for damages against the company or city, for manifestly entirely different legal factors are involved. If the matter should become the subject of litigation it will certainly present many inter-

esting legal features and will, in addition, have important bearing on the scope of compensation acts."

Engineering Record, February 15, 1913.

How to Prevent Lead Poisoning.

The New York State Department of Labor is distributing among factory workmen a poster upon which are printed the following rules concerning the prevention of lead poisoning:

"(1) Always wash before eating and if you work in a factory before leaving the factory.* Remove all dirt from under your finger nails with a brush.

"(2) Never eat in the room in which you work.†

"(3) Never chew tobacco or gum while working. If you do, the lead dust on your fingers and in the air is sure to be swallowed.

"(4) Use overalls when you work. Do not wear your working clothes on the street or at home. They may contain lead and poison you and others.

"(5) Respirators are very useful and should always be used when working among lead dust and fumes.

"(6) Keep the workroom clean. Do all you can to keep down dust. Do not get lead on your hands and clothes any more than you can possibly help.

"(7) Always eat a good breakfast before going to work. Drink plenty of milk. Have at least one good movement of the bowels every day. Constipation is a suggestive symptom of lead poisoning. Avoid the use of intoxicants in any form. Their use weakens the body and makes it harder for your body to overcome the poison of lead.

"(8) Keep clean. Wash with warm water, soap, and nail brush. Take at least one full hot bath a week."

Such a practical, educational method should be very efficacious in eradicating one of the greatest causes of industrial disease.

*In factories the Labor Law requires employers to furnish washing facilities, including hot water and individual towels.

†The Labor Law forbids any worker to take food into any part of a factory, shop or working place where lead is present in "harmful quantities."

The Social Diseases.

The November *Bulletin of the Massachusetts State Board of Health* contains an admirable contribution on "The Eradication of the Social Diseases in Large Cities," by Dr. R. N. Willson of Philadelphia. Perhaps the most interesting part of the paper is the section devoted to the consideration of measures to be avoided in combating prostitution and the social diseases. He considers the unprofitable attitudes and means of attack under three heads:

1. Indisposition, ignorance, inaction. These measures have been tried for centuries and the results speak loudly and positively.

2. Medical examination and segregation. These measures have been tried thoroughly in Europe and here and if anything have aided in the increase of prostitution and in the spread of venereal disease.

3. Vice Commissions. Doctor Willson believes that in the past these have been "at best a sorry attempt on the part of public officials, from the mayor of a city down, to shift a grave personal responsibility and duty on a long-suffering people."

In his consideration of preventive measures it is interesting to note that Doctor Willson recognizes the importance of economic maladjustment as a causative factor. On this subject he says that "starvation wages, the unattractiveness and poverty of the home, the opportunity of an easy income far larger than that obtainable in an honest or honorable livelihood . . . are the conditions that help, at least, in recruiting the ranks of the 300,000 and more of America's public women."

The Owen Bill in the Senate.

"The United States Senate on Monday, by a tie vote, refused to take up the consideration of the Owen bill. This does not finally dispose of the bill as it still retains its place on the Senate calendar and can be called up at any time and considered by a majority vote of those senators present. As it is realized by those friendly to public health legislation that there is little chance of the bill passing the House at the present session, the tie vote on the question of its

consideration can justly be regarded with satisfaction by the friends of a broader national health organization. It is generally understood that Senator Owen will introduce a bill at the next session of Congress, if the present bill does not pass, but it is highly probable that such a bill will be redrafted and considerably modified. If this is the case it is to be hoped that Senator Owen will go back to the original plan and draft a bill calling for a Department of Health, with a secretary in the cabinet. The growing realization of the importance of this subject and the increasing support for it show the educational value of the agitation which has extended over the last three years. The opposition has reached its high-water mark, and the false statements which were so widely circulated regarding the object of the measure and the purposes of its advocates have reacted. The Owen bills have made people think. If they will only think hard enough and long enough to realize the great importance of health conservation, the eventual, inevitable result will be the establishment of a national Department of Health. Nothing short of this should be the aim of those who appreciate the present public health conditions and the needs of the future."

The Journal of the American Association, February 8, 1913.

The Ice Water Tank.

"After July 1, 1913, thirsty passengers on trains in Kansas will not be furnished with ice water unless the railroads supply a means of cooling the water without putting ice into the tanks. The old-fashioned ice water tank on passenger trains must go the way of the common drinking cup and the roller towel in Kansas, according to an edict issued recently by Dr. S. J. Crumbine, Secretary of the State Board of Health. Doctor Crumbine announces that he has had analysis made of the ice water on many Kansas trains during the last few months and in most cases he has found that the water is impure, owing to the method employed of putting impure or dirty ice into the tanks."

The Public Health Journal, December, 1912.

One Day of Rest in Seven.

The December Legislative Program (1912) of the American Association for Labor Legislation presents as its first plank in the Association's legislative platform that which is perhaps the most urgent of any of the several proposals, namely, "One day of rest in seven." The article defines (after the definition of the International Association for Labor Legislation) a continuous trade as one in which the work is carried on seven days a week and day and night for not less than thirty days in the year. The prevalence of seven days labor in the United States is indicated by the fact that 50,000 out of 173,000 employees in the iron and steel industry work seven days a week, most of them twelve hours a day.

In the state of Massachusetts alone there were 221,985 persons doing seven-day labor in 1907, while the number thus employed in Minnesota in 1910 was 98,558. The need for ameliatory legislation is urged not only from the standpoint of the protection of the individual worker, but there is also pointed out the social and economic necessity of conserving our human resources through the preservation of the worker as a group and through the prevention of much premature disease and many avoidable accidents, both resulting frequently from overfatigue.

The Sunday laws are declared to be not only obsolete, impractical and impossible of enforcement, but so shot with exceptions and full of loopholes as to be entirely useless. Such state legislation as there is up to the present time is shown to be abortive and fruitless, as is illustrated by the Massachusetts law, which is comprehensive enough in its scope, covering practically all industrial and commercial pursuits, but exempts "cases of emergency or at the request of the employee."

Finally, the report emphasizes the urgency for a uniform standard law, which shall recognize the necessity for continuous operation in certain industries but shall at the same time insist on non-continuous employment in those industries. The new law must provide for at least twenty-four con-

secutive hours of rest in the week, without regard to the day, for every person employed.

The Inspection of Hospitals.

"The Arkansas State Legislature will be asked to pass a law to provide for the inspection of all public or private hospitals, reformatory homes, houses of detention, convents, asylums, sectarian seminaries, schools or institutions, by the sheriff of the county in which such institutions are situated, or by the grand jury thereof, or by any person or persons appointed by a judge of a court of record, upon a petition signed by twenty citizens of said county, or by volition of the judge. Section 5 of the act provides that any officer, agent, employé or other person or persons, refusing to permit, or interfering in any manner with the inspection of such private or public hospital, reformatory home, house of detention, convent, asylum, sectarian seminary, school or institution, by the sheriff or the grand jury, or any person or persons duly appointed by the judge of a court of record, in accordance with the terms of this act, shall be deemed guilty of a misdemeanor and shall, upon conviction, be punished by a fine of not less than $300 and six months' imprisonment for the first offense, and for each additional offense not less than $500 and one year's imprisonment. Just what is back of this bill, or what has led to its presentation to the Arkansas lawmakers, *The Record* is not informed. Such a law might be of much value, or it might work injury, this all depending on the character and ability of those who may be appointed as inspectors. Under proper inspection, no reputable hospital would have cause for fear, and that class of lying-in places such as are a disgrace to a community would be, or at least could be, controlled. If the Arkansas Legislature passes the act, it will be of interest to watch its results."

International Hospital Record, January, 1913.

Reporting of Occupational Diseases.

The American Association for Labor Legislation has recently published a leaflet on this subject. The paper reviews briefly the symptoms of, and industries associated with, poisoning of lead, phosphorus, arsenic, brass, wood alcohol and mercury; discusses anthrax and compressed air illness, and emphasizes in the following way that uniform reporting of industrial diseases is the the most important of preventive measures:

"The prevalence of some of these diseases has been reported on by federal and state commissions, and by private investigators. Of the prevalence of others we know practically nothing. To remedy this ignorance eight states made a beginning by passing, in 1911 and 1912, laws requiring every physician treating cases of specified occupational ailments to send to the proper state authorities a record of each case with the essential facts concerning it. Of the New York law Commissioner Williams of that state says:

" 'This law has been in effect for a little more than a year, and we are beginning to find out what employments are surrounded by dangers that are almost invisible, but none the less terribly real and a menace to the persons engaged in such employments. The information that comes into our possession enables us to call direct attention to conditions in factories which threaten the health of the workers.' "

The Association is introducing into all the state legislatures a standard uniform bill dealing with this phase of the industrial problem.

Lead Poisoning in the United States.

Leaflet No. 9. of the American Association for Labor Legislation, in dealing with the lead poisoning evil in the United States, besides pointing out the comparative incompleteness of our records, shows further that the amount of plumbism in our country is alarmingly great.

"While foreign records of lead poisoning are based on an accurate system of compulsory reports, our investigators must rely on hospital and dispensary records (which commonly, cover not more than one case out of every four); on physicians' incomplete memoranda; and on the personal statement of a shifting, often foreign-speaking class of employees.

"But in the United States Bureau of

Labor *Bulletin, No. 95*, Doctor Hamilton reports 398 specific cases of lead poisoning among the workers (some 1400) in 22 of our 25 white lead plants, with 16 fatal cases between January 1, 1910, and April 30, 1911. In the same *Bulletin*, Doctor Andrews gives a list of 60 fatal cases of lead poisoning reported by physicians for the state of New York during 1909 and 1910. A hasty study of plumbism in New York City showed 376 cases during 1909, 1910, 1911. The Illinois Commission on Occupational Diseases credits 578 cases to that state during 1908, 1909, 1910. The United States Bureau of Labor, in *Bulletin 104*, reports for 1910–1911, Doctor Hamilton's discovery of 60 cases of lead poisoning among 796 men employed in 40 white ware potteries, and 43 cases among 150 women in the same works; 63 cases among 304 men employed in 18 yellow ware, art and utility ware and tile works, and 35 cases among 243 women in the same works; and 309 cases among the 1,012 men employed in the porcelain enameled iron sanitary ware factories. Out of 148 enamelers and millhands, specifically examined, 36 per cent. were found to be suffering from chronic lead poisoning."

The Prevention of Presenility.

"Old age is not only an important medical question, but a far more important economic problem, because old age carries with itself an incapacity which makes its victims charges on the public, or burdens and handicaps to some individual."

Thus an editorial in the *New York Medical Journal* (January 4, 1913) indicates the individual and social significance of the old age infirmities. The writer further points out, however, that it is not so important for us to attempt to combat old age, as to prevent the *premature* senility resulting from our strenuous civilization. The facts that employers recognize the inefficiency of old age and refuse to employ men past middle life in many instances, that the period of successful competition and efficiency is very short, compel men to try to crowd all the work they can into this period in order to live when their efficiency is impaired. Therefore, a vicious circle results, even though a less strenuous, slower, surer mode of living would be far more economical of life.

The prevention of the inevitable presenility following present modes of living is undoubtedly the adoption of the "simple life," but this is to be attained not so much by asking people to go more slowly as by encouraging regular periods of vacation, periodic relaxation, so as to give a chance for the anabolic processes. "Everyone should, in the language of the sea, be laid up occasionally to prevent too much wear and tear."

Home Work.

The December (1912) *Bulletin of the International Labor Office* contains the resolutions adopted by the International Association for Labor Legislation in Zürich, September, 1912. Of special interest are those resolutions relating to home workers, declared by the delegates to be existing under miserable conditions, caused especially by their absolutely insufficient wages.

To the end of finding means for raising wages for this class of workers the conference offered the following recommendations:—

1. The organization of home workers in trade unions and the conclusion of collective wage agreements with employers and employers' federations.

2. "The adoption by legislation of the principle that wage agreements for insufficient amounts or of an usurious nature should be null and void, and that the conclusion of such agreements should be subject to penalties."

3. Legislation should be founded on minimum rates fixed by wage boards.

4. All disputes should be settled by the wage boards.

5. The delegates are urged to introduce, or cause to be introduced into legislative bodies, bills corresponding to these resolutions.

6. "The national sections are requested to engage in an energetic campaign in order to convince the public of the necessity of fixing minimum wages for home industries."

Unusual Illness among Cotton Weavers.

"A report has recently been issued from the Home Office by Dr. Edgar L. Collis, one of His Majesty's medical inspectors of factories,

which deserves more than passing reference. It is concerned with an outbreak of illness which occurred in three consecutive years among the weavers in a cotton mill at Colne in Lancashire, and in the last of the three years, 1912, in two weaving sheds in Burnley. The symptoms as described by Doctor Collis were dyspnœa with a sense of constriction of the chest beneath the sternum, then rapid and shallow breathing, with occasional deep sighs and a persistent cough with which was associated expectoration of thick yellow or yellowish green sputum and a sweetish taste in the mouth. Later the difficulty in breathing progressed until it resembled asthma, preventing sleep or arousing patients from a disturbed rest, fighting for breath and driving him to throw open the bedroom window for air. There was general malaise, aching limbs and back, severe headache and shivering ending in perspiration; occasionally there was a night temperature of 100 degrees F. to 102 degrees F. As the symptoms persisted, the patient could not hurry when walking, and on ordinary slopes found it difficult to climb; the appetite became affected and there was loss of weight. In a few cases herpetic eruptions on the face, palpitation, smarting and running of the eyes, and loss of the sense of smell occurred. There was no diarrhœa, jaundice, pigmentation of the skin or other symptoms of arsenical poisoning.

"Doctor Collis shows very clearly that these cases of illness must have been caused by a mould which formed on the cotton which was being manipulated. They occurred only in sheds in which cloth was woven for subsequent bleaching or dyeing. This cloth, it appears, cannot have applied to it any antiseptic containing chlorine, since dyers specify that no chlorides shall be present in the goods they purchase. The absence of an antiseptic enables mildew to grow on the warps, especially as the size with which the cotton is treated is composed for the most part of flour, tallow, china clay and water. The illnesses may have been caused by the inhalation of the spores of mildew or from inhaling certain injurious gases which are liberated in certain circumstances from mildew growths. In favor of the latter view are the facts that the symptoms appeared with great rapidity, for, when the operatives resumed work at Burnley after a fortnight's absence, several of them were seen to be suffering at eleven o'clock in the morning—an onset so rapid as to leave but little time for an incubation period. A definite smell was noticed on some of the cotton, and those operatives who worked near two exhaust fans, which would draw any gas towards them, placed in the roof, were more affected than those farther off. In order to prevent a recurrence of this form of illness, Doctor Collis speaks with approval of treating the sized cotton with formaldehyde as an antiseptic. His careful investigation into the whole question should prove of the greatest service to medical practitioners in the cotton districts."

The Medical Officer, February 8, 1913.

The Waste from Disease in Industry.

Dr. John Andrews, Secretary of the American Association for Labor Legislation, in speaking before the National Civic Federation in February, 1913, presented to that organization some interesting facts and figures concerning industrial disease and its prevention. He is quoted in the *New York Times* (February 7) as follows:

"In the last two years organizations and individuals coöperating throughout the country have achieved at least one notable triumph in procuring the enactment of legislation by the federal government prohibiting the use of phosphorus in the match-making industry in the old way with its inevitable consequences of phosphorus poisoning to the workers. The agitation also has come to include in its aims the establishment of special clinics and hospitals for the treatment of workers in the industries that bring on occupational diseases—the weaving industry, with its unregulated moisture in weaving sheds and drying houses, the hatter's industry, with its tremulous workers suffering from mercurial poisoning; the miners suffering from asthma in the dark damp of the mines; the workers in dusty and lint-filled shops, and the workers in compressed air in tunnels and at the foundations of bridges.

"In the building of the foundations of one bridge at St. Louis alone, it was found that of 600 men employed there, 119 were ill and fourteen died as a result of working in the compressed air. In the construction of the Pennsylvania tunnel in this city 3,400 men suffered from compressed air lungs. All this was absolutely preventable.

"There is only one law on the statute books in the United States looking to such prevention, however, and that is in New York. There are no less than twenty-seven trades in which workers are menaced by arsenic poisoning, and 138 trades in which the workers are in constant danger of lead poisoning. It is estimated that at least 13,000,000 cases of sickness each year among industrial workers result from occupational diseases, and a money loss of nearly $750,000,000 annually. Of this, it is believed, at least one fourth is absolutely preventable.

"Investigation of mercurial poisoning of workers in the United States developed the fact that physicians treating such cases were not sending reports thereof to the proper authorities, and that statistics on the subject could therefore not be kept. Mrs. Lindon W. Bates got a law passed in New York requiring physicians to report such cases, and since then eight other states have followed suit.

"There is crying need of general legislation requiring careless employers to instal safety devices and machinery to carry off dangerous dust and fumes in their factories. Illinois is the only state in the Union that has proper labor legislation at present.

"The logical thing would be to have workmen's compensation and insurance against industrial accidents and occupational diseases as well. There are, however, many obstacles in the way of that.

"In the first place there is a general apathy of the public, which can be and is being overcome by educational propaganda through just such meetings as this.

"Then there is the interested opposition to such legislation by some physicians who, thriving on large practice among workers in such dangerous occupations, so far forget their social obligations as to oppose the enactment of preventive or remedial legislation to shield the workers.

"In the third place there is the opposition of manufacturers, who fear that if they go to the expense of providing defensive machinery and methods in their factories, competitors less humane than they will be able to undercut them in the price of their product and thus undersell them.

"Finally, there are some manufacturers who threaten, if such legislation is passed in one state, to move forthwith into another where there are no such laws. These threats, however, are for the most part bluff, and can be made all the more ineffective by passing uniform labor laws in all the states at the same time."

Communication.

To the Editor.

Sir: I am undertaking an exhaustive research into the pathology, etiology and dietotherapy of diabetes mellitus. I am very anxious to hear from every physician in the United States who has a case under treatment, or who has had any experience in the treatment of this malady. Von Noorden says "the best treatment for the diabetic is the *food* containing the *greatest* amount of *starch* which the patient can bear without harm." If any physician who reads this has similar or contrary experience and would take the trouble to write me, I would esteem it a special privilege to hear from him, if only a postal card.

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